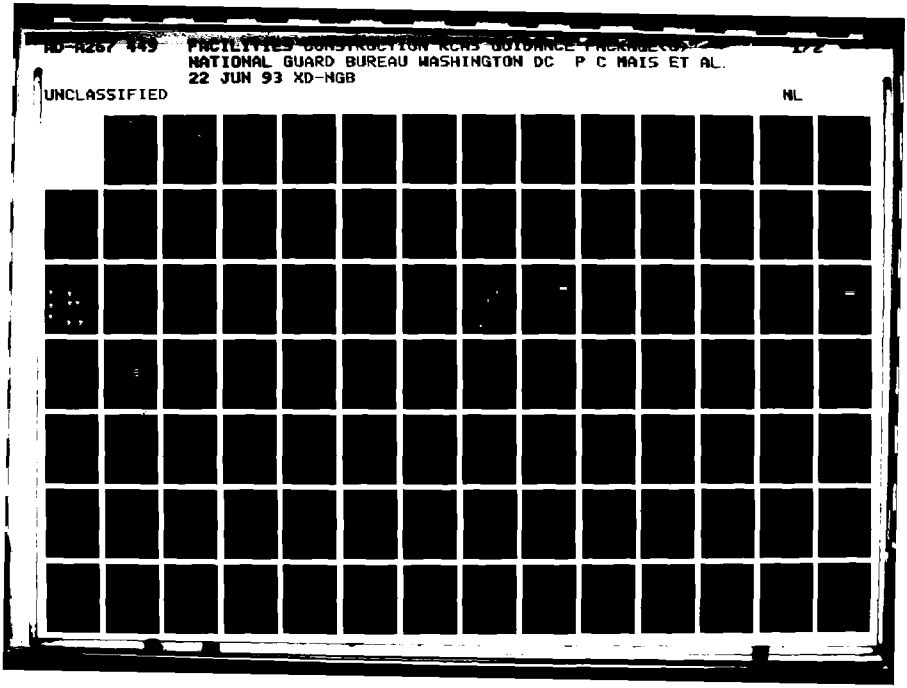
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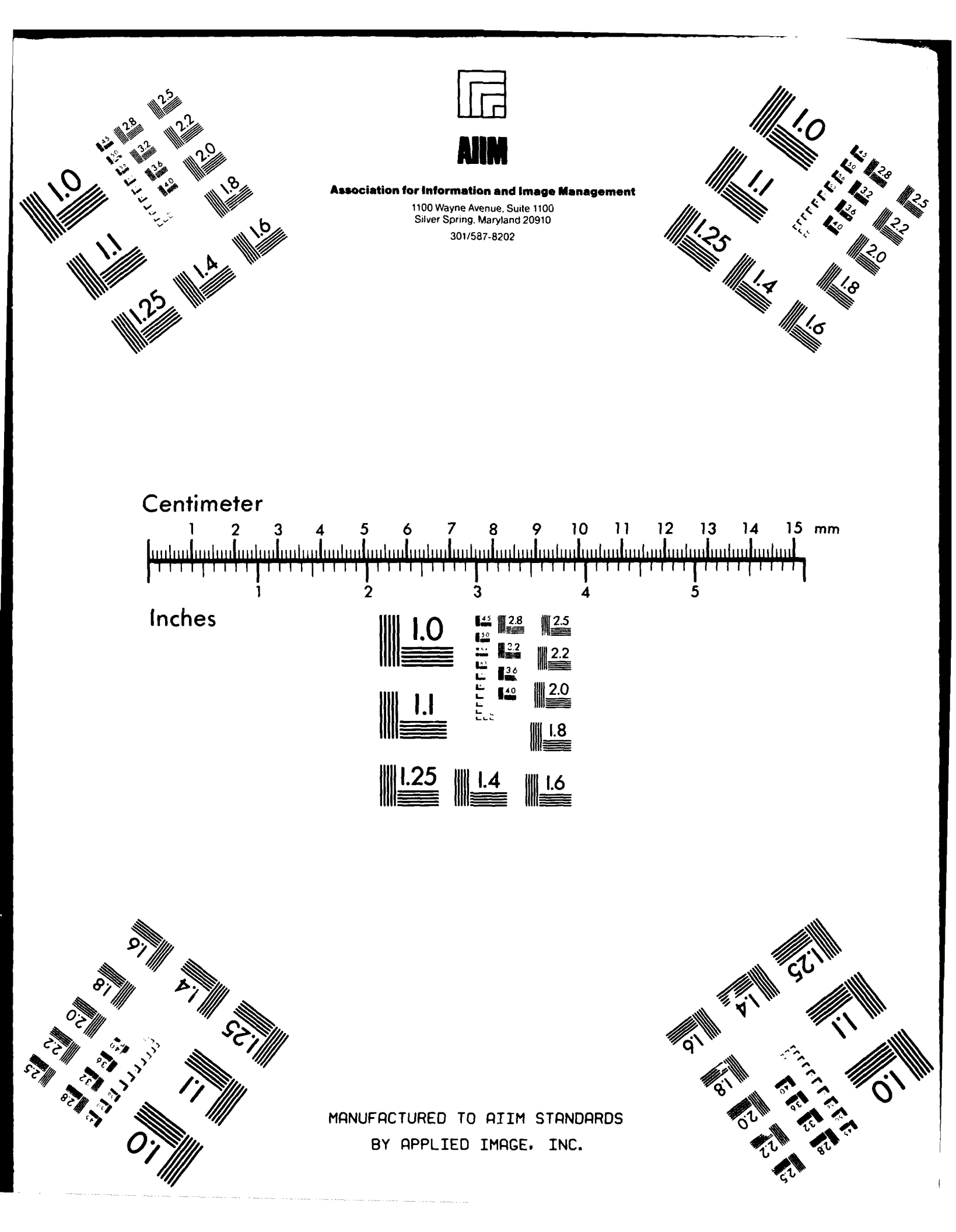
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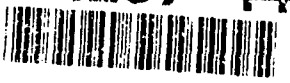

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The Facilities Construction Guidance Package was developed for the purpose of providing technical guidance relative to RCAS for facilities being planned or constructed. This working document provides assistance to begin the process of developing facility design and facility planning at any stage of construction development. Detailed requirements about security are identified as currently known. The audience of this package are the proponents and architects of the facilities being planned or constructed.

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Reserve Component Automation System

FACILITIES CONSTRUCTION
RCAS GUIDANCE PACKAGE

Prepared for

Department of the Army
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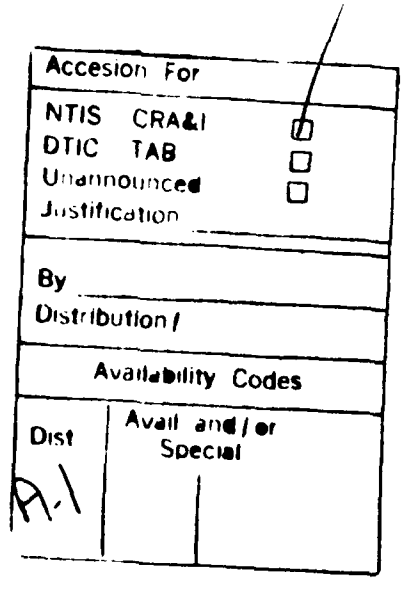

Foreword

This Facilities Construction Guidance Package has been developed for the purpose of providing technical guidance relative to RCAS for facilities being planned or constructed. The audience of this package are the proponents and architects of the facilities being planned or constructed. This working document provides assistance to begin the process of developing facility design and facility planning at any stage of construction development. Detailed requirements about security are identified as currently known. System engineering changes and security requirements will invoke improvements which will likely effect the requirements, causing the document to continually evolve. As new design requirements are formulated, they will be incorporated into future updates of this package.

Notice

This document contains only Generic/Global long range planning data and is to be used as a planning guide only. This guidance package is subject to change throughout the fielding process.

No RCAS funding is provided for any facility engineering actions prior to the actual installation of the RCAS.

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Acronym List

RCAS	Reserve Component Automation System
RC	Reserve Component
IP	Issue Plan
PMO	Program Manage Office
PVC	Polyvinyl
GFE	Government Furnished Equipment
FTS	Federal Telecommunications System
OA	Office Automation
VAC	Volts Alternating Current
LAN	Local Area Network
WAN	Wide Area Network
SOP	Security Operations Plan
MFA	Material Fielding Agreement
X-Terminal	Same as X-Term/X-Station (Dumb Terminal)
DEMARC	Where Outside Telephone Lines Enter The Building
BLK	Black
BTU	British Thermal Unit
AMP	Ampere
NEMA	National Electrical Manufacturer Association
KVA	Kilo Volt Ampere
HVAC	Heating Ventilation Airconditioning
SCSI	Small Computer System Interface
PDS	Protected Distribution System
SDD	Secure Data Device
NES	Network Encryption System
CCI	Controlled Cryptographic Items

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Readers Instruction Guide

To assist the reader in deriving their RCAS facility planning requirements, an instructional flow diagram has been provided. This flow diagram provides the reader with a step-by-step process of deriving the necessary requirements without the need of unnecessary searching through the document.

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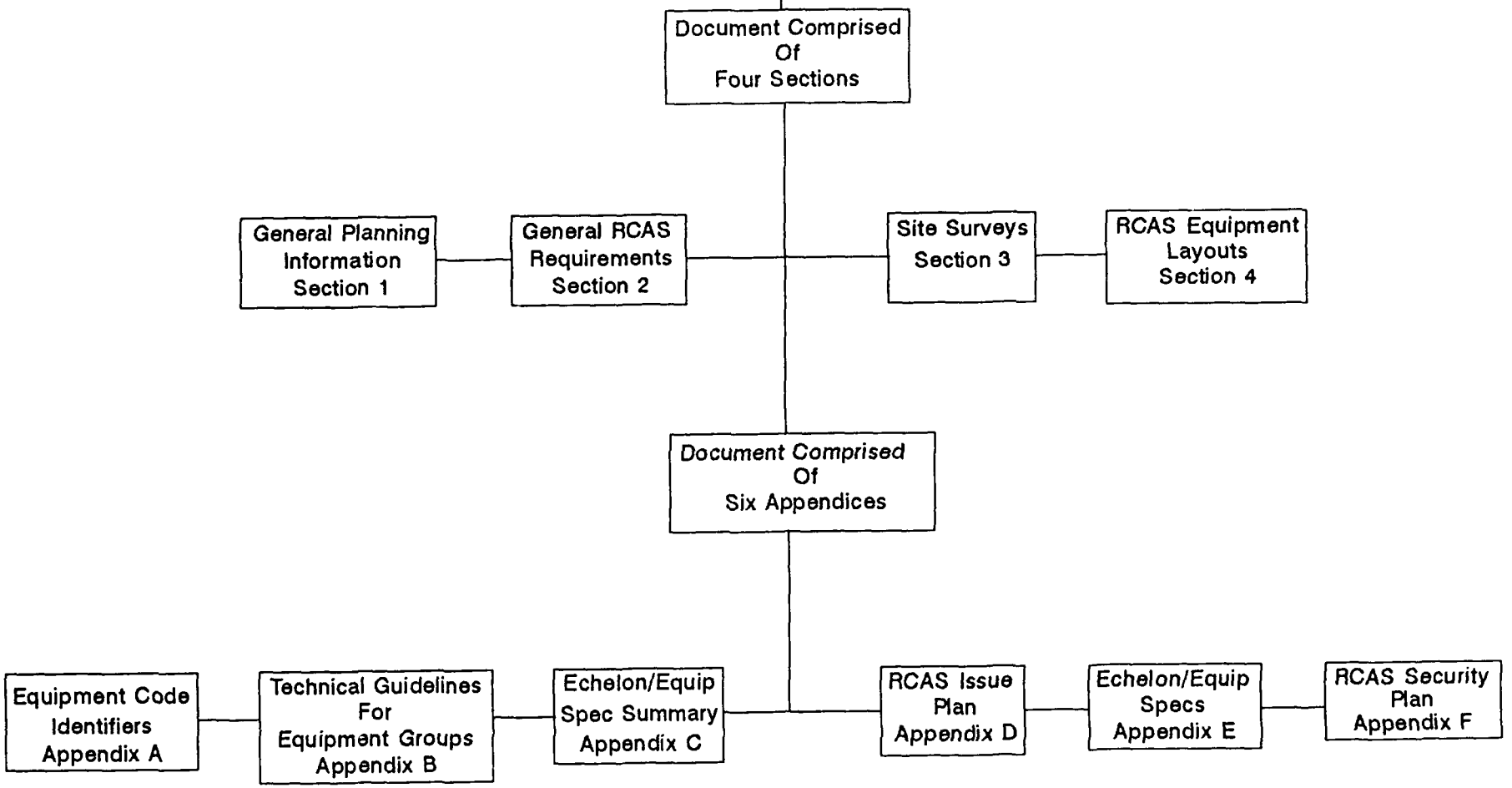

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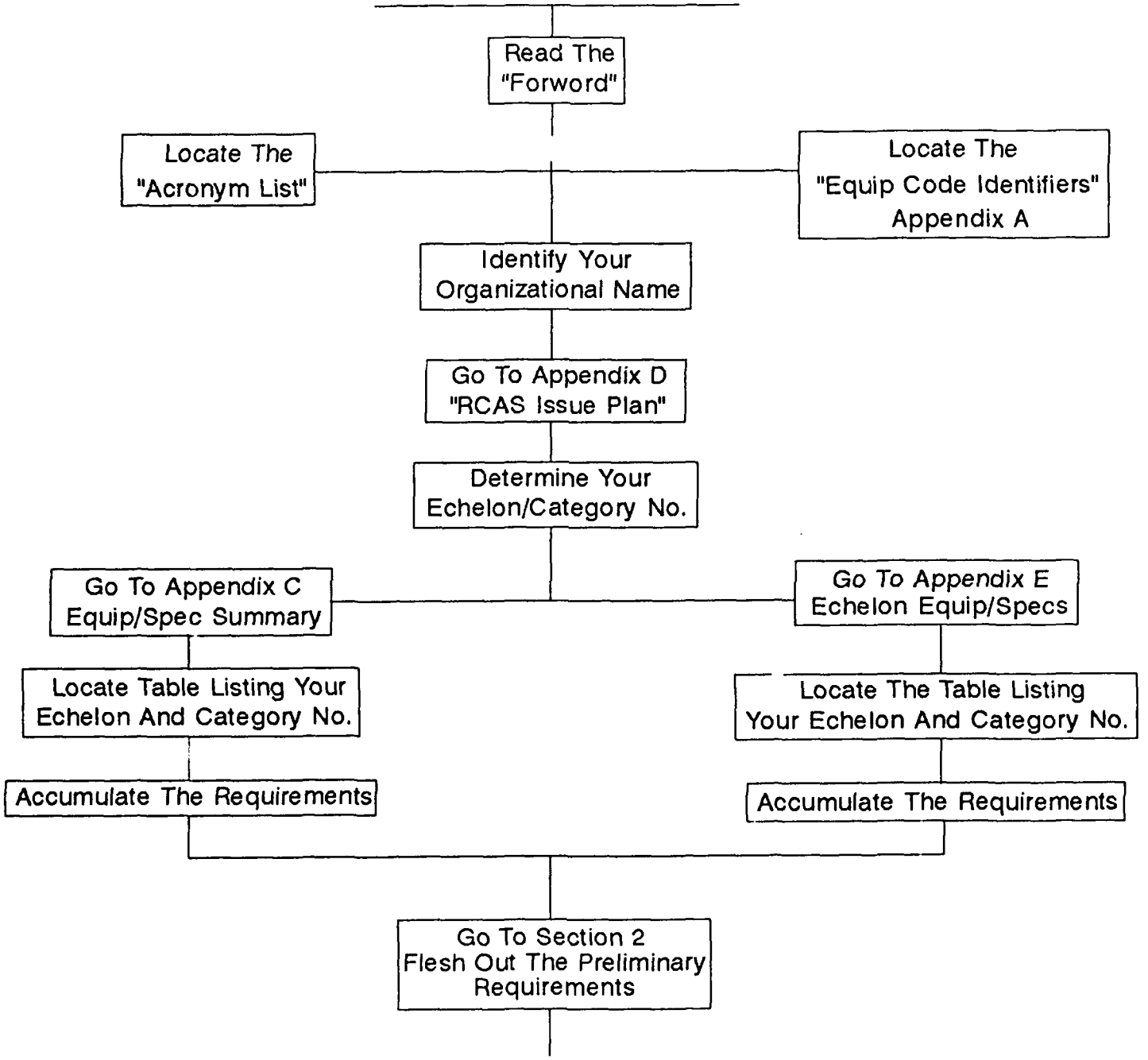
FLOW CHART



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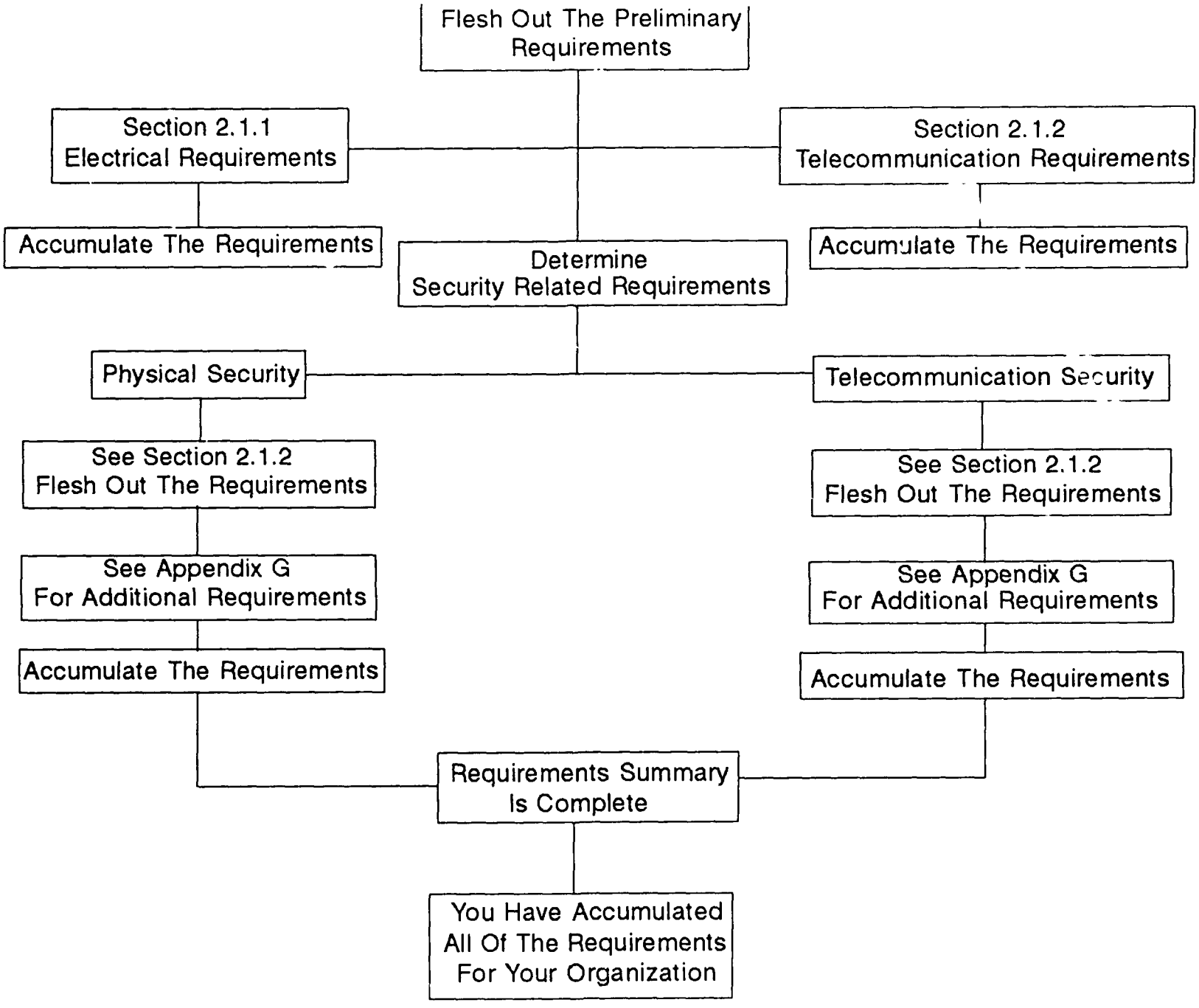
Flesh Out The Preliminary Requirements
Section 2.1.1 Electrical Requirements
Section 2.1.2 Telecommunication Requirements
Accumulate The Requirements
Determine Security Related Requirements
Accumulate The Requirements
Physical Security
Telecommunication Security
See Section 2.1.2 Flesh Out The Requirements
See Section 2.1.2 Flesh Out The Requirements
See Appendix G For Additional Requirements
See Appendix G For Additional Requirements
Accumulate The Requirements
Accumulate The Requirements
Requirements Summary Is Complete
You Have Accumulated All Of The Requirements For Your Organization

FLOCHT3

SECTION 1 GENERAL PLANNING INFORMATION FOR RCAS INSTALLATION

1.1 GENERAL CONSIDERATIONS

It is important to recognize that RCAS is evolving, particularly in the area of Security, and there are provisions for technology enhancement over the life cycle of the contract. Therefore, **the use of this document is for general planning purposes.** It allows proper planning for floor space, electrical power and telecommunications capability. Boeing will begin the physical details of the RCAS installation approximately 10 months prior to installation date.

1.1.1 Specific Areas of Consideration. Specific areas of consideration include but are not limited to:

1.1.1.1 Electrical. This document provides the necessary information to install, or make provisions to install, appropriate electrical service and outlets for the RCAS.

1.1.1.2 Telecommunications. Using this document, plans can be made to reserve space for the installation by placing the communications cabinets in strategic locations to accommodate the RCAS requirements. The structure to support the cabling can be provided even though the cable would not be pulled until the installation of RCAS occurs (i.e. conduit in the building as appropriate, conduit between buildings as appropriate, cable trays in the structure as appropriate).

1.1.1.3 Room Divider Panels. Where room dividers are used in a facility, panels which accommodate telecommunications cabling and electrical service should be considered.

1.2 Determining Facility Requirements. The following steps provide guidance in determining facility requirements.

A. **First**- Determine the specific Reserve Component (RC) organization(s) that will occupy the facility. This should include all host and tenant organizations.

B. **Second**- Use the RCAS Issue Plan (IP) (Appendix D) to determine the echelon and category of your organization.

C. **Third**- Apply the Echelon Equipment/Specification Tables (Appendix E) and

the Equipment/Specifications Summary Tables (Appendix C) to accumulate the requirements.

D. **Fourth**- Use the General RCAS Requirements Information (Section 2) as appropriate to flesh out the preliminary requirements.

1.3 Additional requirements

A. When it is known where the organizations to occupy the facilities will be physically located within the facilities, the RCAS Fielding process will be invoked during the 14 month fielding cycle period to make the final preparations for RCAS installation. The RCAS PMO Fielding Division will initiate this action through the Materiel Fielding Agreement process, based on scheduled installation dates for the organization.

B. RCAS installations shall conform to federal, state and local building codes and standards.

C. Specific Security Requirements will be included in this document as they are finalized and approved.

D. When installing thin wall conduit in the interior walls of office spaces, meeting rooms, shops and storage spaces, allow for changes in future office arrangement patterns.

E. In false ceiling facilities where interior walls terminate at or sightly above ceiling level, the conduit should terminate 6" to 1' above wall height. Keep in mind the conduit must be grounded if not plastic.

F. Concrete floors and ceilings should be penetrated by a separate 4" conduit passage to a centralized wiring closet location for adjacent floors.

G. Where wiring closets are not available or appropriate, the penetration should follow electrical wiring, but must accommodate a 4" diameter wiring bundle.

H. If walls and floor/ceiling are cast concrete, the engineers need to ensure the conduit conforms to code.

I. Conduit, if required, should be plastic. (Metal conduit is permissable)

J. Due to congressional direction, no GFE equipment may be used by RCAS.

K. Long haul lines are provided by FTS 2000. Cable drops will be at the location of the communication cabinets.

L. Intrabuilding cabling requirements are met by installing a 4" PVC conduit with a pull wire. Boeing will install the cabling as part of the RCAS site preparation process.

M. Modular furniture with built in wiring provisions, if used has a security wire separation requirement. Refer to figure 5 and also the Users Security Manual for RCAS Block X, dated 2-15-93.

1.4 Negotiating Features

Fiber Optic cable may be a solution if it is already installed pending technical compatibility, accessibility, serviceability and security requirements at the time of the RCAS installation.

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SECTION 2 GENERAL RCAS REQUIREMENTS INFORMATION

2.1 Areas New Facility Requirements Will Cover. RCAS facility requirements will cover two areas. Electrical and Telecommunications. In respect to the following requirements, RCAS shall conform to federal, state and local building codes and standards.

2.1.1 Electrical

A. DEC 5000 Application Server A, E, and R Equipment Groups require 120 volt 20 Amp dedicated circuits.

B. DEC 5500 Application Servers C, F, G, I, J, L, and M Equipment Groups require 240 volt single phase 30 Amp dedicated circuits.

C. For all 208V, 220V and 240V circuits, the new facilities should provide blank spaces in the power panel for these circuits. The required electrical outlet boxes should be installed blank with the associated conduit and pull wires.

D. Zenith 486 Office Automation (OA) Server (P1 thru P6) Equipment Groups (Figure B3), should be installed with 120 volt 20 Amp circuits (See H. below). A dedicated circuit is not a technical requirement however, 10.3 amps must be constantly available for satisfactory operations. The important thing is to ensure the required amperage is available at all times.

E. Printers will be adjacent to Application Servers. They should be installed with 120 volt 20 Amp circuits (See H. below). A dedicated circuit is not a requirement however, 7.3 Amps must be constantly available. This outlet should be adjacent to the outlet serving the Application Server.

F. Telecommunications cabinets require 2 - 120V, 20Amp Circuits.

G. Equipment which does not require dedicated electrical circuits, will require sufficient power for continuous operation.

H. The RCAS system is being installed with 20 Amp circuits throughout.

I. Use minimum of #12 gauge wire for all circuits.

J. Install panel boxes & boards with oversize neutral with 20% space/capacity for future growth.

2.1.2 Telecommunications

A. Local Area Networks (LANs) will be used to connect the various X-Terms and telecommunications related devices in the Applications Server group.

1. Building features should accommodate easy ways of routing or rerouting telecommunications cables (cable trays, conduits, tethers/pull wires, etc.)

2. Proposed RCAS LAN pathways must be dedicated to RCAS cables and maintain appropriate separation from all "black" cables.

B. Telecommunications cables shall not be installed, but instead install blank PVC conduit with pull wires. The necessary cabling will be installed prior to installation of the RCAS, by Boeing facility modification contractors.

C. If the new facility includes multiple buildings, the telecommunications cabling between buildings should not be installed, but instead put in 4 inch interbuilding PVC conduit with pull wires. The cabling will be installed by Boeing facility modification contractors prior to installation of the RCAS.

D. Security related requirements (See Appendix F for draft Copy of Users Security Manual/Security Operations Plan for the RCAS Block X, dated 15 Feb 93). Changes in security requirements are expected to evolve over the life cycle of RCAS. Appropriate updates will be made to this document.

1. Telecommunications related - If the specifications of paragraphs A., B., and C., above are adhered to, most of the telecommunications security problems will be solved. The LAN wire and cable separations as shown in Figure 5, lay out the necessary gaps and distances, and should be used when planning for installation of cabling and conduit.

D. Security related requirements Cont.

2. Physical Security related - Buildings should be built with an interior room that has true floor to true ceiling construction to allow for future use as an open storage area for classified material. This is a must for units that get Network Encryption System (NES) devices. When Keyed, NES devices must be provided protection commensurate with the classification of the key it contains. In the RCAS environment, all NES devices will be keyed SECRET, thus, rooms must be built to the standards for open storage of SECRET, as stated in AR 380-5, paragraph 5-102,b. Offices in which other RCAS equipment is to be placed, should be constructed as any other office in which high cost, sensitive equipment is housed.

SECTION 3 SITE SURVEYS

3.1 Finalizing Facility Engineering Details. Within 14 months of fielding, the RCAS Fielding process will be invoked to finalize the facility engineering details for the RCAS installations.

SECTION 4 RCAS EQUIPMENT LAYOUTS

4.1 Equipment Configuration Graphic Layouts. Equipment configuration graphic layouts have been illustrated, to aid in visualizing layout formats. The RCAS is not confined to a regimented layout . Variations may be negotiated during the MFA process. However, using the illustrations as a guide will provide the appropriate insight for planning the configuration for your unit. The distances portrayed in the subsequent subsections are both cost and technical baselines. Changes may be negotiated during the Material Fielding Agreement (MFA) and Site Survey processes.

4.1.1 Simple Site Layout. RCAS will have two basic configurations, a Simple Site (Figure 1) and Complex Site (Figure 2). The Simple Site layout will consist of one server with a maximum of 8 X-Terminals and a printer. The Equipment will be linked from the fanout box with distances not to exceed 300 cable feet maximum unless otherwise negotiated in the MFA/Site Survey process. The Simple Site layout will be used by small units.

4.1.2 Complex Site Layout. The Complex Site layout (Figure 2) will be utilized by larger units. These units will have a minimum of one communication cabinet, one LAN cabinet plus two or more servers and possibly multiple DEC 5000 or 5500 processors with many X-Terminals (up to 16 X-Terminals per 486 server). The equipment will be served from the LAN cabinet for distances not to exceed 300 cable feet. Greater separation distances if necessary will be negotiated in the MFA/Site Survey Process.

4.1.3 Server and X-Terminal Distances. Server and X-Terminal Distances are illustrated in Figure 3. The line distances cannot exceed 300 cable feet from the LAN cabinet to the connected device. Coverage can be maximized by judicious placement of the LAN cabinet as demonstrated in figure 3. A maximum of 600 cable feet is possible within an organization if the Server is placed in a central location..

4.1.4 Expanding Distances. Distances greater than those shown in Figure 3 can be accommodated (but are an extra cost) through the use of interconnections between LAN cabinets. The exact arrangement and equipment quantities required are determined by the MFA/Site Survey Process.

4.1.5 Using Several Communications Cabinets/Closets. At Complex Sites the equipment layout can be enormous. This can be simplified by using two or more Communications Cabinets/Closets illustrated in Figure 4. The use of multiple Communications Cabinets/Closets allow for distribution of equipment without long and massive line bundles. Lines still need to adhere to the 300 cable feet requirement from the Communications Cabinet/Closet.

4.1.6 RCAS Cable Separation. For security purposes the RCAS (Red) cables need to be adequately separated from all other Black lines (Phone lines etc.) as referenced in Figure 5. The Red and Black wires/cables have a separation requirement of 50mm for parallel runs of 30m or less and 150mm for parallel runs of greater than 30m. When Red and Black wires/cables cross at angles of 78 to 90 degrees a separation of 1" (2.54cm) is required. The separation distances are subject to change pending release of security guidelines.

4.1.7 Floor Plan Equipment Configuration Layout. The Example layout shown in Figure 6, depicts the possible arrangement of a P4 equipment group, (7) Monochrome X-Stations, (1) Color X-Station, (1) Printer and a two drawer safe.

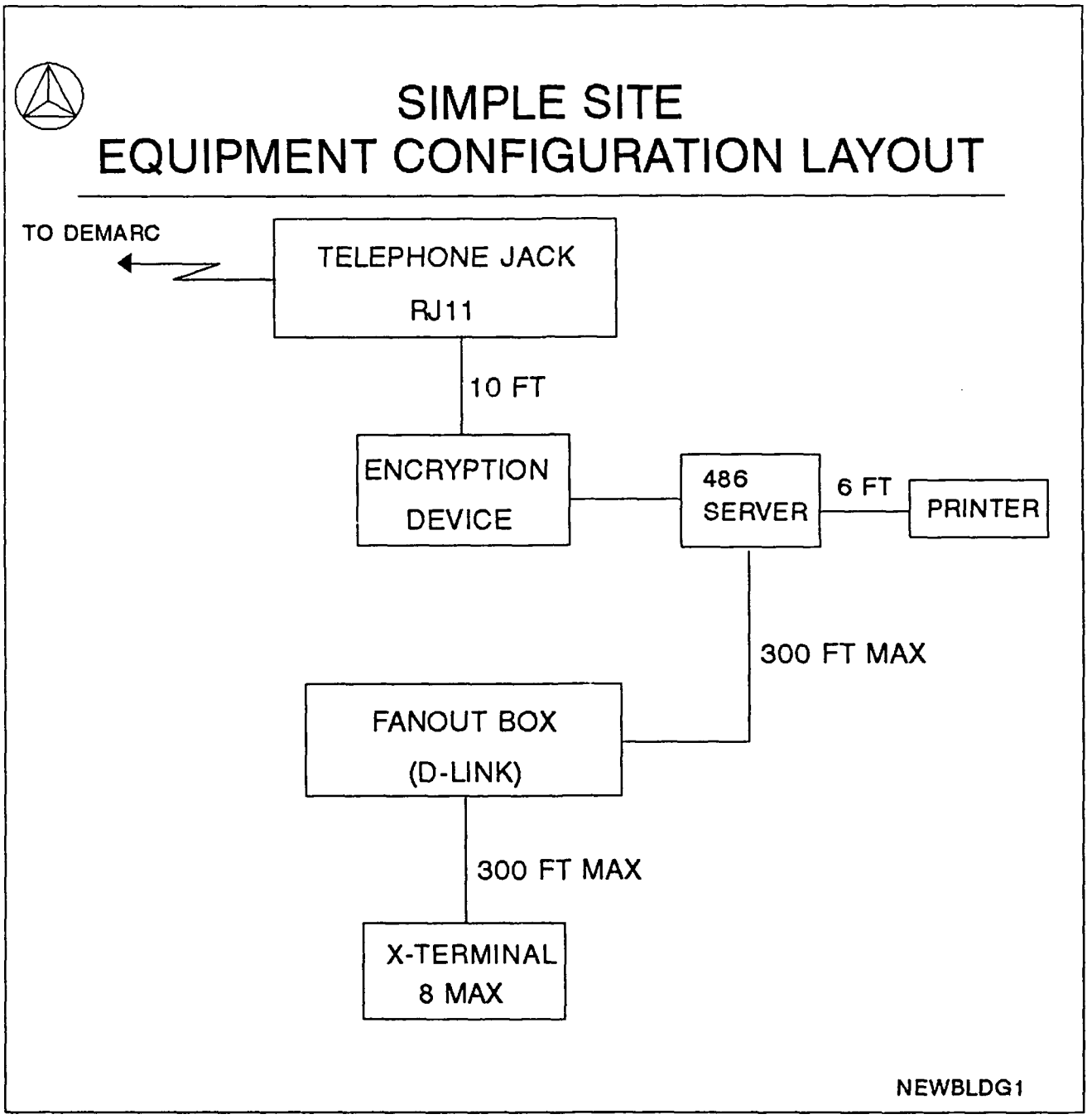
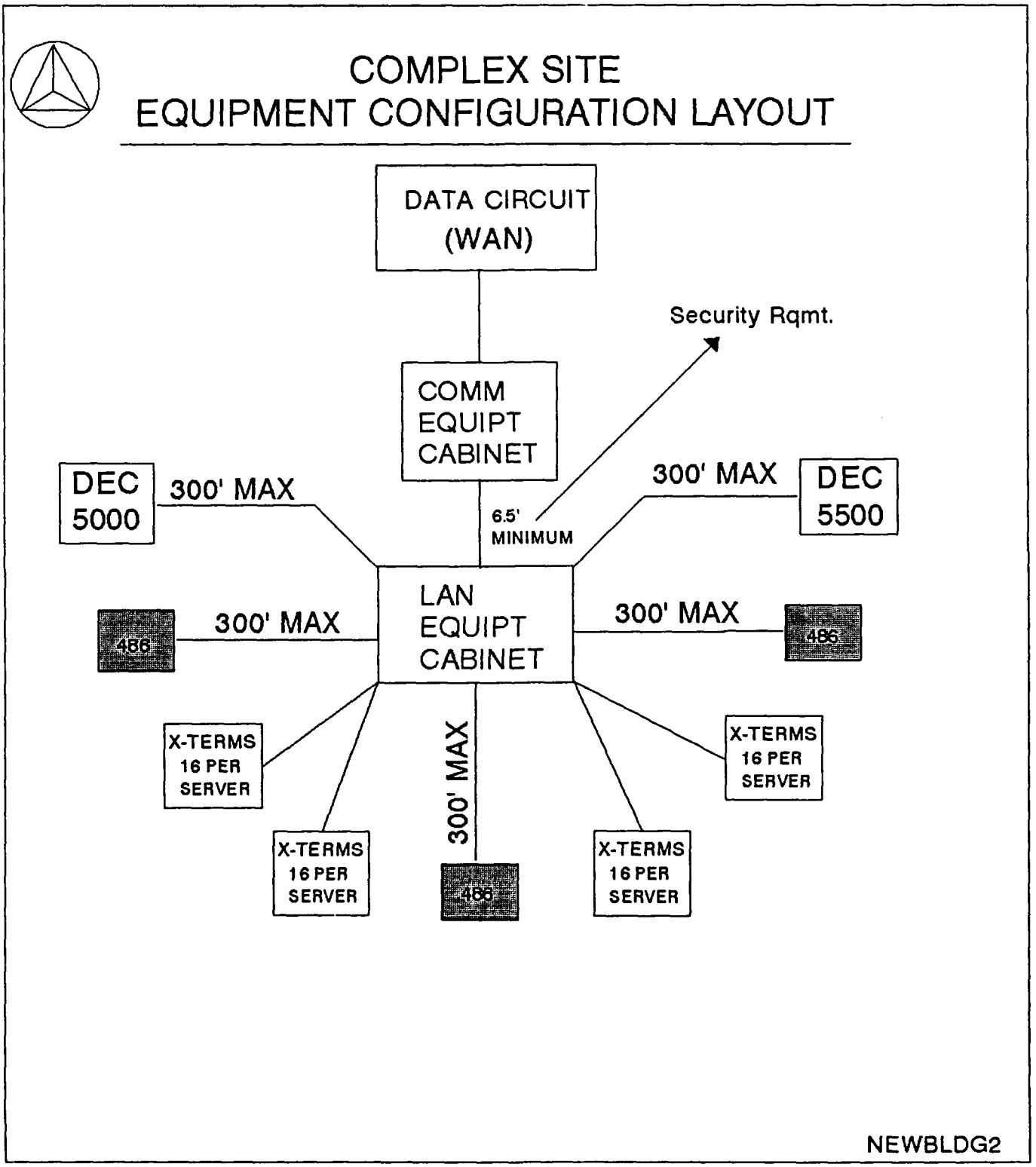

SIMPLE SITE
EQUIPMENT CONFIGURATION LAYOUT
TO DEMARC
TELEPHONE JACK
RJ11
10 FT
ENCRYPTION
DEVICE
486
SERVER
6 FT
PRINTER
300 FT MAX
FANOUT BOX
(D-LINK)
300 FT MAX
X-TERMINAL
8 MAX
NEWBLDG1

FIGURE 1


COMPLEX SITE
EQUIPMENT CONFIGURATION LAYOUT
DATA CIRCUIT
(WAN)
Security Rqmt.
COMM
EQUIPT
CABINET
DEC
5000
300' MAX
6.5'
MINIMUM
300' MAX
DEC
5500
LAN
EQUIPT
CABINET
486
300' MAX
300' MAX
486
X-TERMS
16 PER
SERVER
300' MAX
X-TERMS
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SERVER
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SERVER
486
X-TERMS
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SERVER
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FIGURE 2

SERVER AND X-TERMINAL DISTANCES

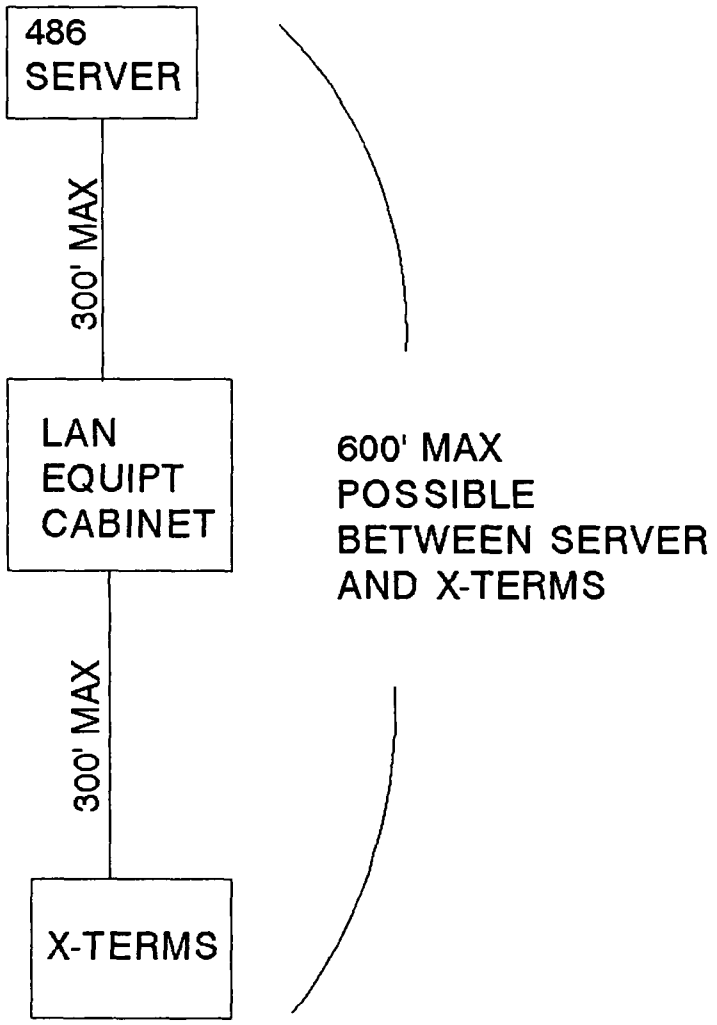

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FIGURE 3

EQUIPMENT LAYOUT
USING SEVERAL COMMUNICATION CLOSETS

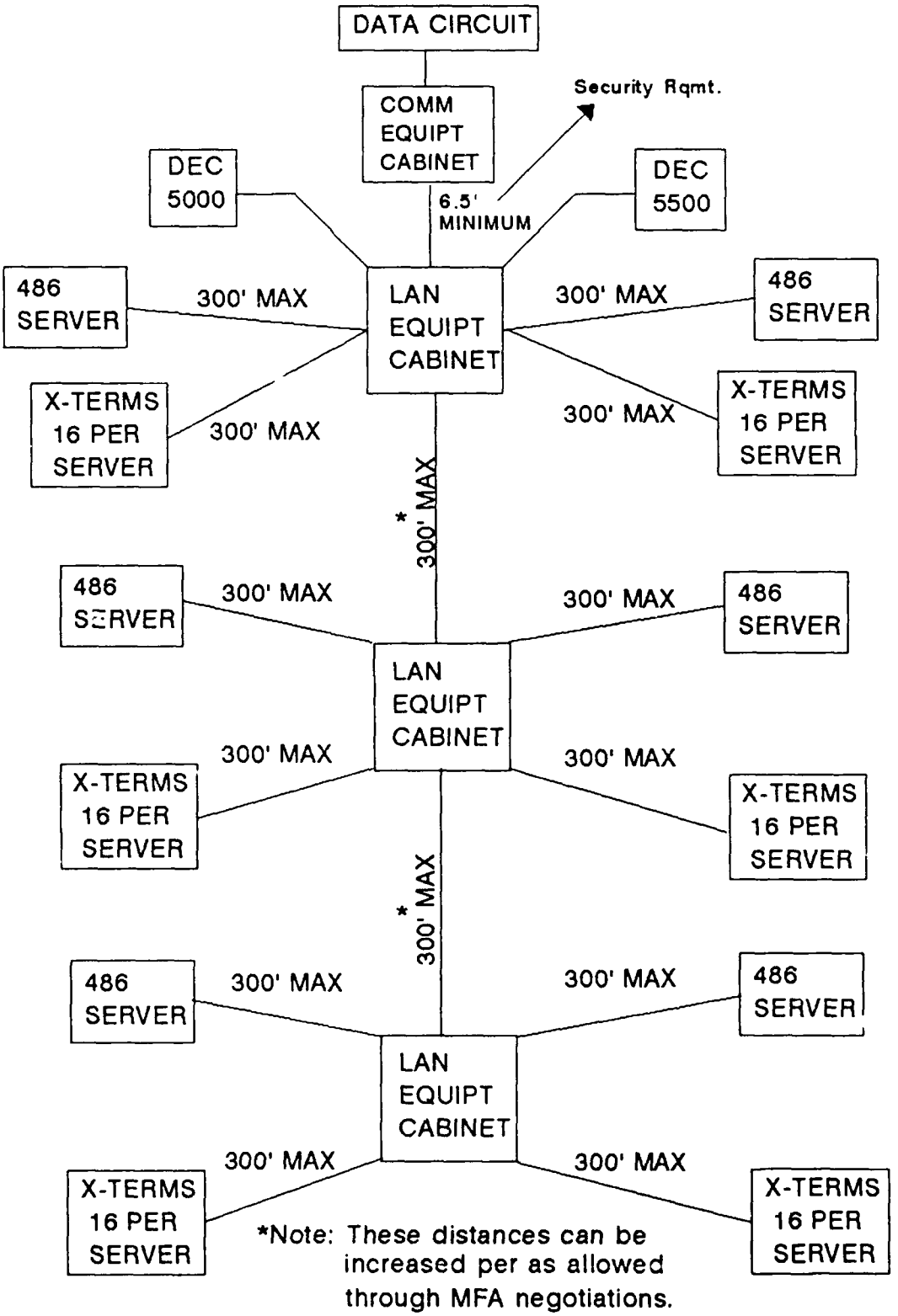
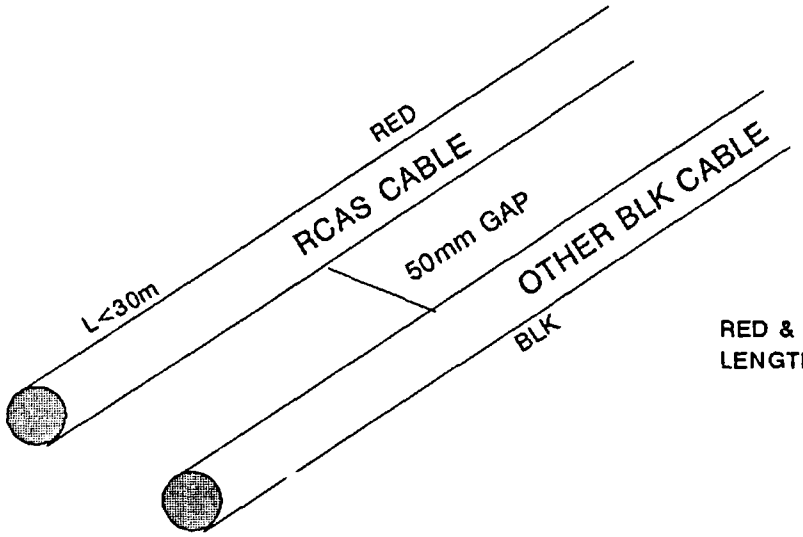
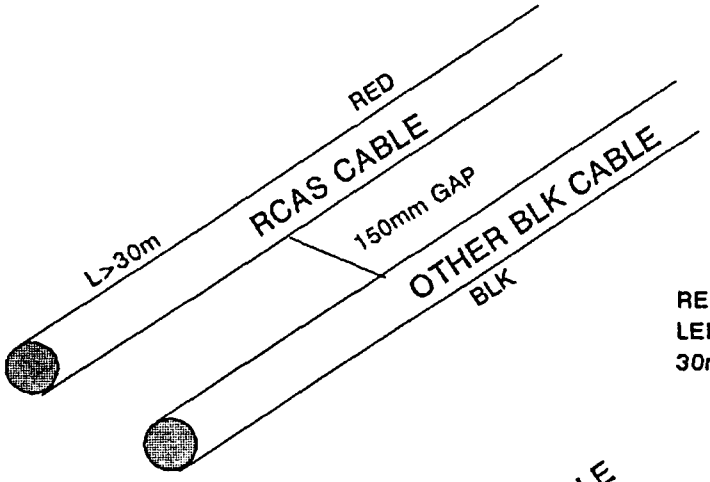


FIGURE 4

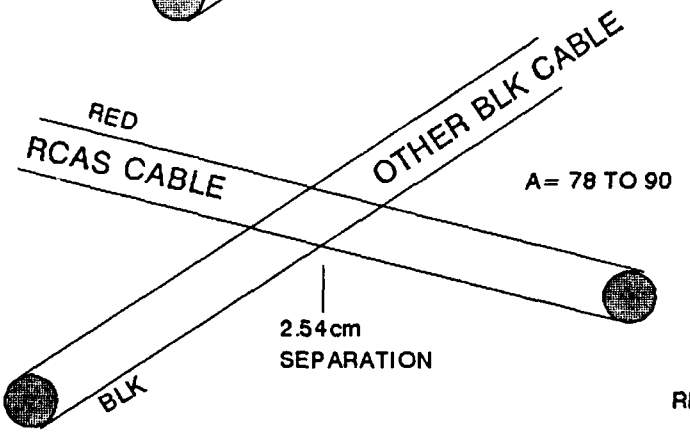
LAN WIRE AND CABLE SEPARATION



RED & BLK PARALLEL RUNS
LENGTH LESS THAN 30m



RED & BLK PARALLEL RUN
LENGTH GREATER THAN
30m



RED & BLK WIRES CROSSING

NEWBLDG6

FIGURE 5

(A)- ENCRYPTION DEVICE

(B)- FANOUT BOX

(C)- 486 SERVER

(D)- DISK CABINET

(E)- UPS

(F)- TRANSCEIVER

(G)- Printer

EXAMPLE BUILDING FLOOR PLAN EQUIPMENT LAYOUT

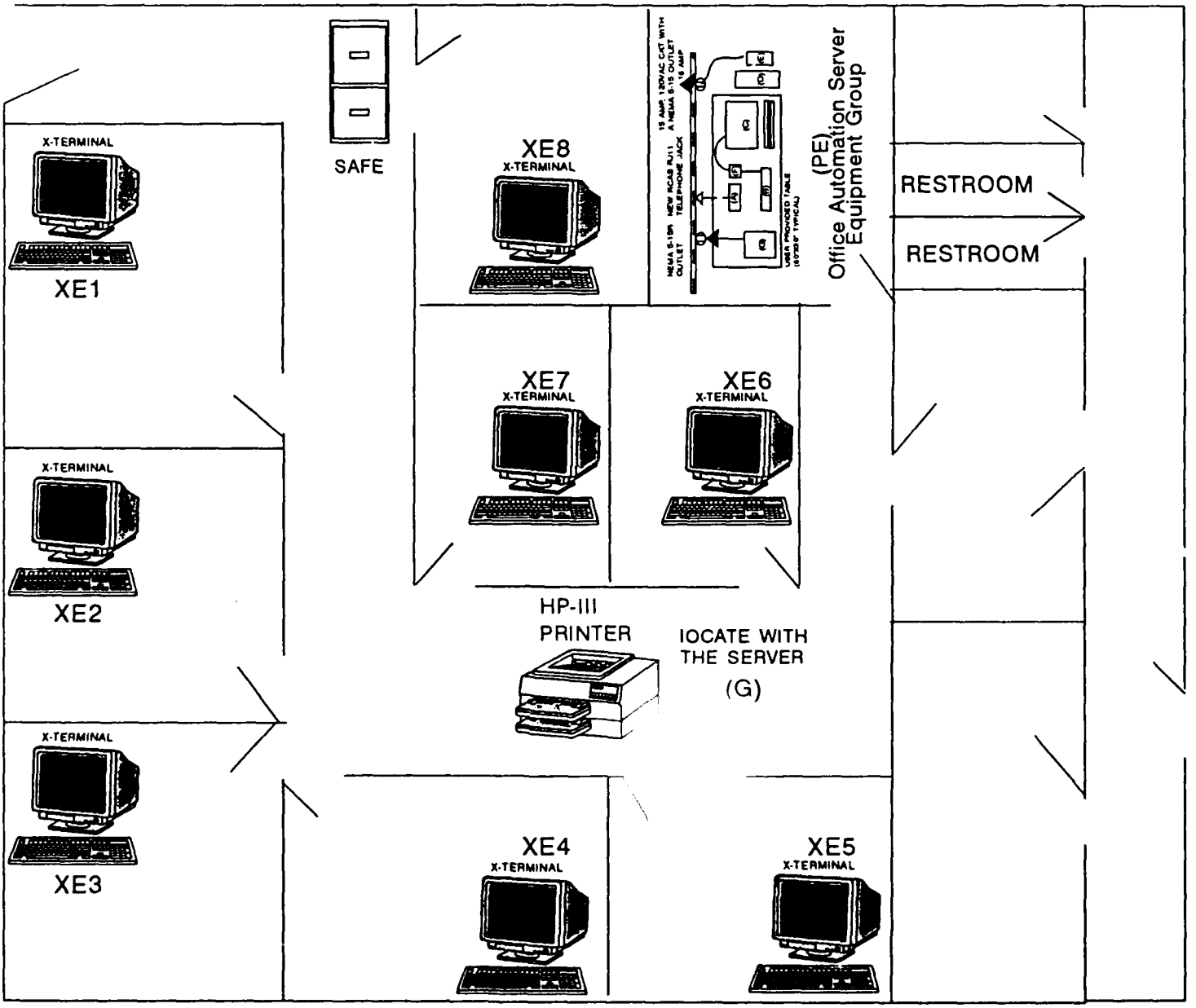


FIGURE 6

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Appendix A

Equipment Code Identifiers

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EQUIPMENT CODE IDENTIFIER

8MM	8MM TAPE BACKUP DEVICE
BARI	PORTABLE BAR CODE READER
BARS	SERIAL (TETHERED) INDOOR BAR CODE READER
CAD	CAD/CAM WORKSTATION FOR ENGINEERING
CD	CD ROM PLAYER
CE	COMMUNICATION EQUIPMENT CABINET
DEC-A	APPLICATION SERVER "A" DEC 5000 2.0 GB
DEC-C	APPLICATION SERVER "C" DEC 5500 3.0 GB
DEC-E	APPLICATION SERVER "E' DEC 5000 3.0 GB
DEC-F	APPLICATION SERVER "F" DEC 5500 4.0 GB
DEC-G	APPLICATION SERVER "G" DEC 5500 5.0 GB
DEC-I	APPLICATION SERVER "I" DEC 5500 7.0 GB
DEC-J	APPLICATION SERVER "J" DEC 5500 10.0 GB
DEC-L	APPLICATION SERVER "L" DEC 5500 2.0 GB
DEC-M	APPLICATION SERVER "M" DEC 5500 6.0 GB
D3	688MB SCSI DISC DRIVE
D4	1000MB SCSI DISC DRIVE
D-LINK	FANOUT BOX
EI-HW	EXTERNAL INTERFACE HARDWARE
FANOUT	TWISTED PAIR FANOUT DEVICE
MAP	MAP GRAPHICS WORKSTATION
MOSL-2	2 DRAWER SAFE
MOSL-4	4 DRAWER SAFE
MOSL-5	5 DRAWER SAFE
OA-LAPTOP	OFFICE AUTOMATION SW FOR LAPTOP COMPUTER
P1	1-2 USER SERVER
P2	3-4 USER SERVER
P3	5-6 USER SERVER
P4	7-8 USER SERVER
P6	9-16 USER SERVER
PHC	PHOTOGRAPHIC VIDEO COPIER
PLOT	DRAFTING COLOR PLOTTER
PLT	LAPTOP COMPUTER
SCAN	HP SCANNER
UPS2	1.0 KVA UNINTERRUPTABLE POWER SUPPLY (UPS)
UPS4	2.0 KVA UPS
XE	17" MONOCHROME X-STATION (XE)
XEC	14" COLOR X-STATION (XEC)

EQUIPMENT CODE IDENTIFIER

XECL	19" COLOR X-STATION
XEL	19" MONOCHROME X-STATION (XEL)
X-TERM	SAME AS X-TERMINAL/X-STATION - DUMB TERMINAL
XR	17" MONOCHROME X-STATION (XR)
XRC	14" COLOR X-STATION (XRC)
XRL	19" MONOCHROME X-STATION (XRL)
ZP	POSTSCRIPT LASER PRINTER
ZX	LASER PRINTER
ZX3	LASER PRINTER W/3MB MEMORY
ZZ	MONOCHROME LOWSPEED PRINTER

NOTE: XE and XR X-stations are actually the same exact devices. XE denotes that they attach directly to an ethernet drop while XR denotes that they attach to a fanout box.

Appendix B

Technical Guidelines for Selected Equipment Groups

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DEC 5500

DEC C,F,G,I,J,L & M Equipment Group/Specifications

EQUIPMENT GROUP AG

FIGURE B1

TECHNICAL GUIDELINES: APPLICATIONS PROCESSOR (AG)

POWER: 30 amp, 240VAC, single phase circuit with one NEMA L14-30R outlet for the uninterruptable power supply (UPS). All equipment will be powered by the UPS except the laser printer. The laser printer requires a NEMA 5-15R, 15 amp outlet powered by a separate 120VAC circuit.

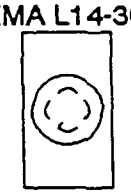
LOCATION: The Applications Processor (AG) must be located within 300' (cable length) from the communications equipment cabinet (CE).

TEMPERATURE AND HUMIDITY: Must be between 60-90°F and 20%-80% humidity.

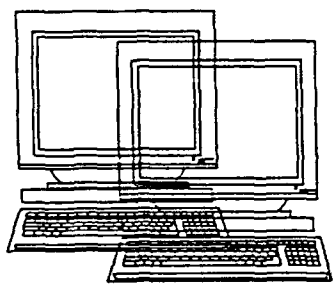
Equipment Specifications: APPLICATION PROCESSOR (AG)

-Outlets required:	30 amp, 240VAC, single phase circuit with a NEMA L14-30R outlet
-Amps:	24.00
-Power(KVA):	5.00
-Volts:	240
-BTU/Hr:	12,240
-Weight:	1,234 lbs.

NEMA L14-30R

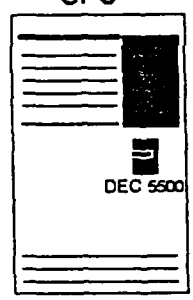


(A) 2 TERMINALS



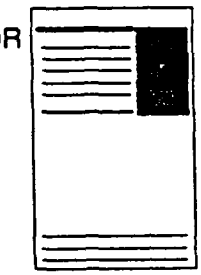
10"hx12"wx13"d

(C) CPU



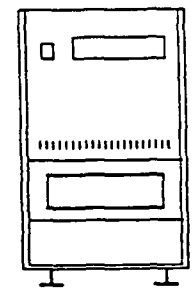
27"hx21"wx18"d (Front View)

(G) MASS STORAGE



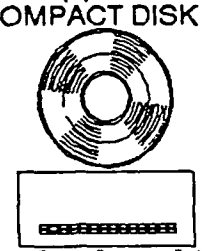
27"hx21"wx18"d

(D) TAPE DRIVE



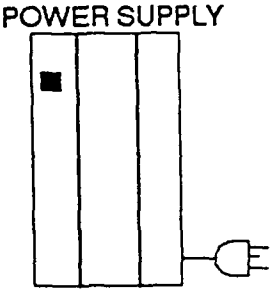
42"hx21"wx30"d

(F) COMPACT DISK



3"hx9"wx11"d

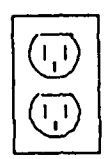
(E) UNINTERRUPTABLE POWER SUPPLY



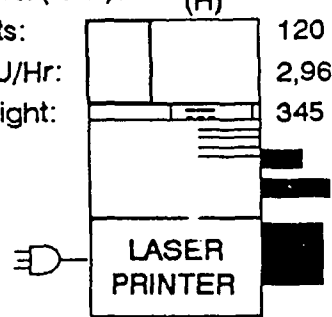
42"hx9"wx25"d

Equipment Specifications: LASER PRINTER

-Outlets required:	NEMA 5-15R outlet
-Amps:	7.25
-Power(KVA):	1.09
-Volts:	120
-BTU/Hr:	2,969
-Weight:	345 lbs.



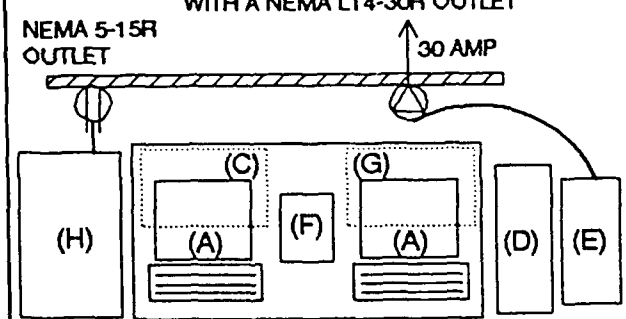
(H)



50"hx37"wx27"d (Side View)

TYPICAL LAYOUT
(Top View)

30 AMP, 240VAC, SINGLE PHASE CIRCUIT WITH A NEMA L14-30R OUTLET



USER PROVIDED TABLE
(60"x30"Typical)

FORM: AG APR 92

DEC 5000

DEC A,E, & R Equipment Group/Specifications

EQUIPMENT GROUP AR

FIGURE B2

TECHNICAL GUIDELINES: APPLICATIONS PROCESSOR (AA)

POWER: 20 amp, 120VAC circuit with one NEMA 5-20R outlet for the uninterruptable power supply (UPS). All equipment will be powered by the UPS except the laser printer. The laser printer requires a NEMA 5-15R, 15 amp outlet powered by a separate AC circuit.

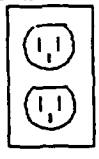
LOCATION: The Applications Processor (AR) must be located within 300' (cable length) from the communications equipment cabinet (CE).

TEMPERATURE AND HUMIDITY: Must be between 60-90° F and 20%-80% humidity.

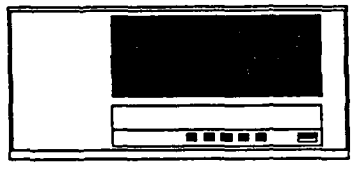
Equipment Specifications: APPLICATIONS PROCESSOR (AR)

-Outlets required:	20 amp, 120VAC circuit with a NEMA 5-20R outlet
-Amps:	16.00
-Power(KVA):	2.00
-Volts:	120
-BTU/Hr:	3,458
-Weight:	310 lbs.

NEMA 5-20R

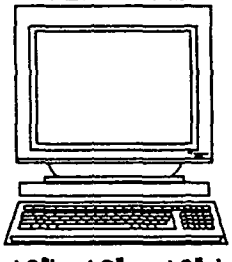


(D) TAPE DRIVE



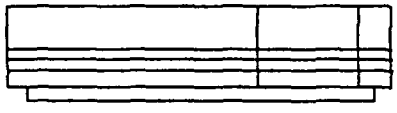
11"hx20"wx27"d

(A) TERMINAL



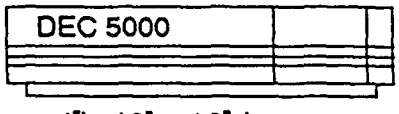
10"hx12"wx13"d

(B) DISK DRIVE



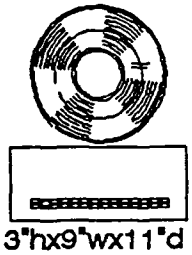
6"hx18"wx16"d

(C) CPU



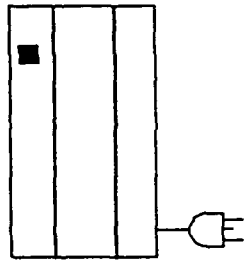
4"hx18"wx16"d

(F) COMPACT DISK



3"hx9"wx11"d

(E) UNINTERRRUPTABLE POWER SUPPLY



14"hx8"wx22"d

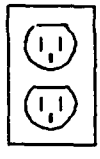
(G) TERMINAL SERVER

5"hx19"wx13"d

(Front View)

Equipment Specifications: LASER PRINTER

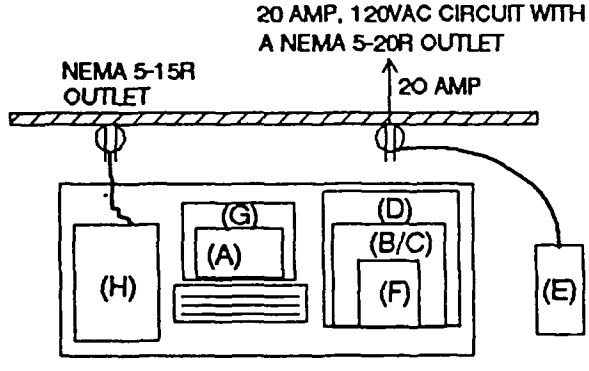
-Outlets required:	NEMA 5-15R outlet
-Amps:	6.75
-Power(KVA):	1.01
-Volts:	120
-BTU/Hr:	2,765
-Weight:	42 lbs.



(H)

15"hx21"wx24"d (Side View)

TYPICAL LAYOUT (Top View)



USER PROVIDED TABLE (60"x30"Typical)

FORM: AR APR 92

Office Automation Server
P1 thru P6 Equipment Group/Specifications

EQUIPMENT GROUP PE
FIGURE B3

TECHNICAL GUIDELINES: OFFICE AUTOMATION SERVER (PE)

POWER: 15 amp, 120VAC circuit with one NEMA 5-15R outlet for the uninterruptable power supply (UPS). All equipment will be powered by the UPS except the laser printer. The laser printer requires a NEMA 5-15R, 15 amp outlet powered by a separate AC circuit.

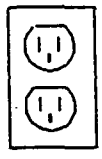
LOCATION: PE location will dictate the location of the network telephone data circuit. The laser printer is provided with a standard 6' cable for connection to the server.

TEMPERATURE AND HUMIDITY: Must be between 60-90°F and 20%-80% humidity.

Equipment Specifications: OFFICE AUTOMATION SERVER (PE)

-Outlets required:	15 amp, 120VAC circuit with a NEMA 5-15R outlet
-Amps:	10.3
-Power(KVA):	1.24
-Volts:	120
-BTU/Hr:	3,500
-Weight:	282 lbs.

NEMA 5-15R



RJ11 TELEPHONE JACK

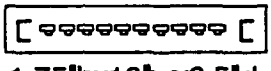
(F) TRANSCEIVER

1"hx3.5"wx5"d

(A) ENCRYPTION DEVICE

2.5"hx8"wx9.5"d

(B) D-LINK CONCENTRATOR

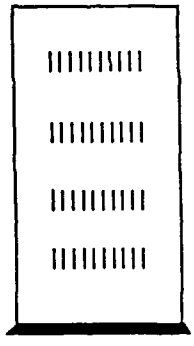


1.75"hx19"wx8.5"d

(C)

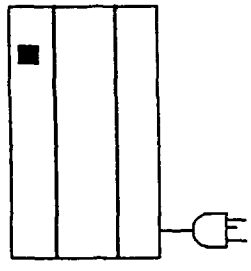
17"hx15"wx15"d

(D) DISK CABINET



23"hx13"wx24"d

(E) UNINTERRUPTABLE POWER SUPPLY

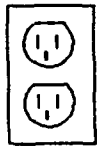


14"hx8"wx20"d

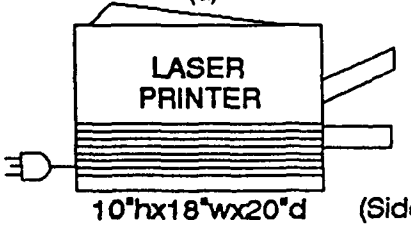
(Front View)

Equipment Specifications: LASER PRINTER

-Outlets required:	NEMA 5-15R outlet
-Amps:	7.25
-Power(KVA):	1.09
-Volts:	120
-BTU/Hr:	2,969
-Weight:	50 lbs.

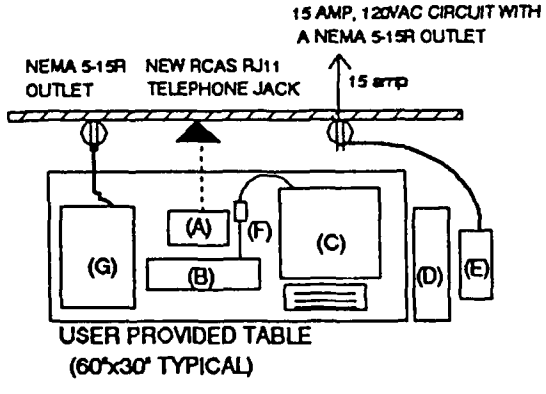


(G)



10"hx18"wx20"d (Side View)

TYPICAL LAYOUT
(Top View)



USER PROVIDED TABLE
(60"x30" TYPICAL)

FORM: PE APR 92

X-Terminal Workstation
XE,XEC,XEL,XECL,XR,XRC & XRL
Equipment Group/Specifications

EQUIPMENT GROUP XE
FIGURE B4

TECHNICAL GUIDELINES: X-TERMINAL WORKSTATION (XE)

POWER: NEMA 5-15R, 15 amp outlet. Two adjacent XEs may use one duplex outlet.

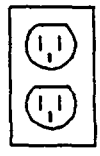
LOCATION: XEs are provided with a standard 50' cable for connection to the PE equipment group. The maximum cable length is 300'.

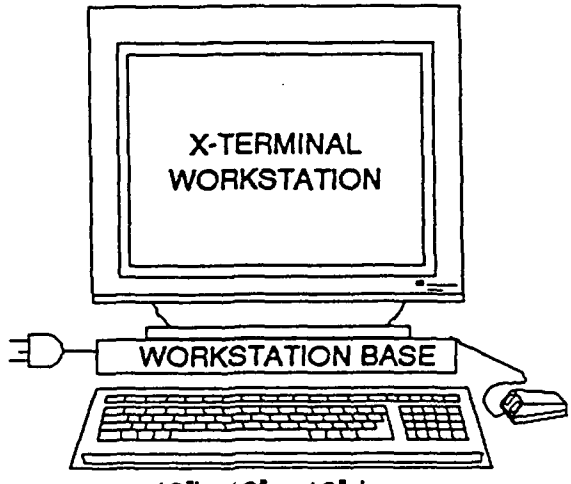
TEMPERATURE AND HUMIDITY: Must be between 60-90°F and 20%-80% humidity.

Equipment Specifications: X-TERMINAL WORKSTATION (XE)

-Outlets required:	NEMA 5-15R, 15 amp outlet
-Amps:	1.50
-Power(KVA):	0.23
-Volts:	120
-BTU/Hr:	615
-Weight:	54 lbs.

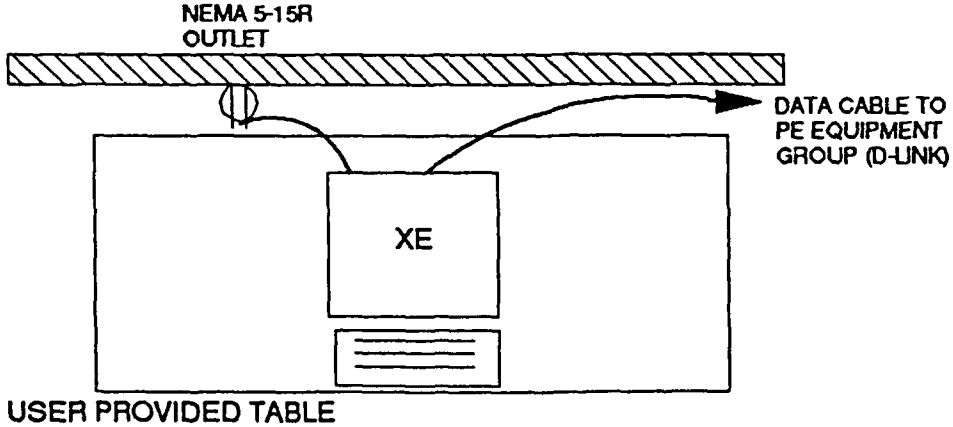
NEMA 5-15R





19"hx19"wx18"d
(Front View)

TYPICAL LAYOUT
(Top View)



USER PROVIDED TABLE
(60"x30"Typical)

FORM: XE MAY 92

Low Speed Printer
ZZ Equipment Group/Specifications

EQUIPMENT GROUP ZZ
FIGURE B5

TECHNICAL GUIDELINES: LOW SPEED PRINTER (ZZ)

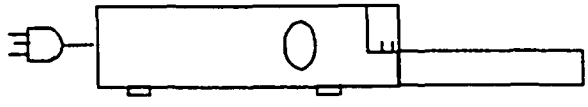
POWER: The ZZ is powered by the surge suppressor supplied with the supporting X-Terminal Workstation (XE).

LOCATION: Must be directly connected to the supporting XE base and is provided with a standard 6' cable.

TEMPERATURE AND HUMIDITY: Must be between 60-90° F and 20%-80% humidity.

Equipment Specifications: LOWSPEED PRINTER (ZZ)

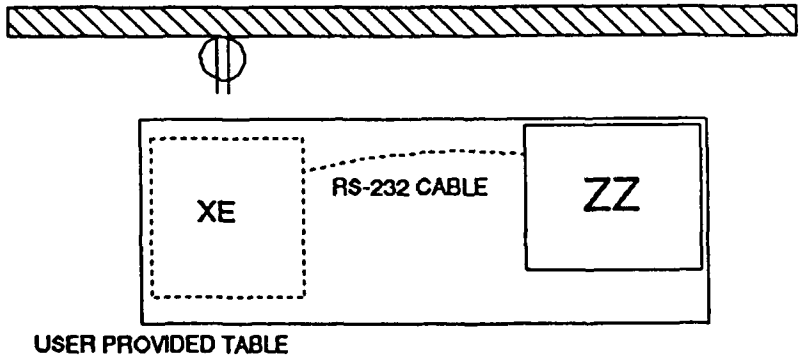
-Outlets required:	Surge Suppressor
-Amps:	0.21
-Power(KVA):	0.03
-Volts:	120
-BTU/Hr:	85
-Weight:	14 lbs.



8"hx17'wx15'd

(Side View)

TYPICAL LAYOUT
(Top View)



USER PROVIDED TABLE
(60"x30"Typical)

FORM: ZZ APR 92

Image Recorder (Video Copier)
PHC Equipment Group/Specifications

EQUIPMENT GROUP PH
FIGURE B6

TECHNICAL GUIDELINES: IMAGE RECORDER (VIDEO COPIER) (PH)

POWER: NEMA 5-15R, 15 amp outlet.

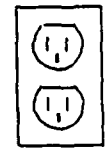
LOCATION: Must be located adjacent to the supporting server for direct connection.

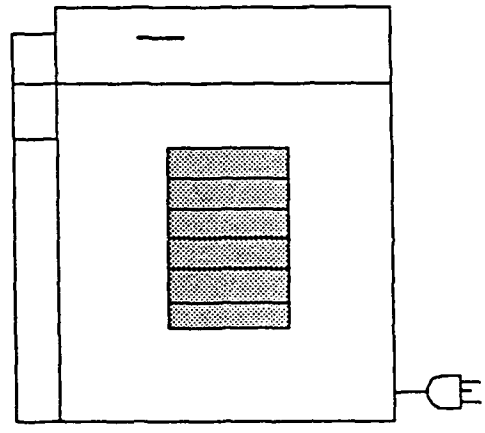
TEMPERATURE AND HUMIDITY: Must be between 60-90° F and 20%-80% humidity.

Equipment Specifications: IMAGE RECORDER (VIDEO COPIER) (PH)

-Outlets required:	NEMA 5-15R, 15 amp outlet
-Amps:	0.51
-Power(KVA):	0.08
-Volts:	120
-BTU/Hr:	210
-Weight:	50 lbs.

NEMA 5-15R

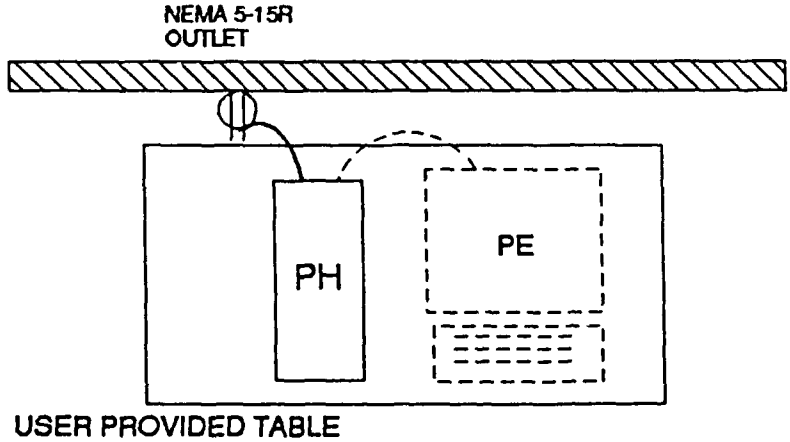




13"hx8'wx21'd

(Front View)

TYPICAL LAYOUT
(Top View)



USER PROVIDED TABLE
(60"x30"Typical)

FORM: PH APR 92

Drafting Color Plotter
PLOT Equipment Group/Specifications

EQUIPMENT GROUP PL
FIGURE B7

TECHNICAL GUIDELINES: DRAFTING COLOR PLOTTER

POWER: NEMA 5-15R, 15 amp outlet.

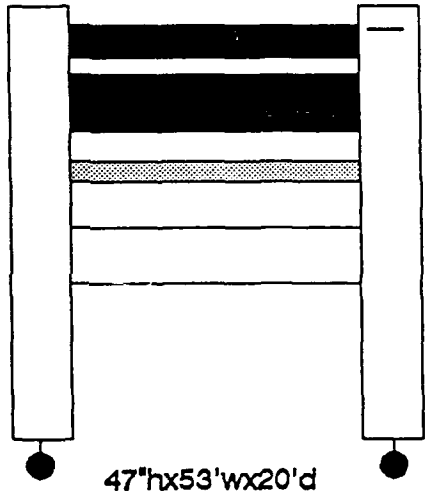
LOCATION: Must be directly connected to the supporting CAD Workstation (CD) and is provided with a standard 6' cable.

TEMPERATURE AND HUMIDITY: Must be between 60-90 °F and 20%-80% humidity.

Equipment Specifications: DRAFTING COLOR PLOTTER (PL)

-Outlets required:	NEMA 5-15R, 15 amp outlet
-Amps:	1.30
-Power(KVA):	0.16
-Volts:	120
-BTU/Hr:	427
-Weight:	164 lbs.

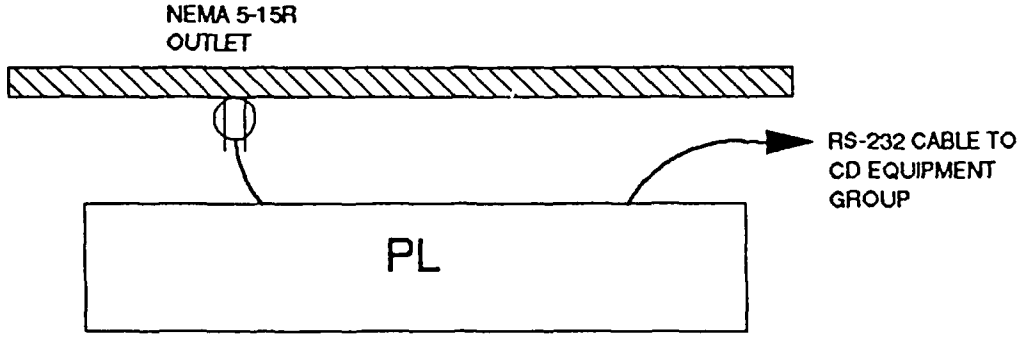
NEMA 5-15R



47"hx53'wx20'd

(Front View)

TYPICAL LAYOUT
(Top View)



FORM: PL APR 92

HP Scanner
SCAN Equipment Group/Specifications

EQUIPMENT GROUP SC
FIGURE B8

TECHNICAL GUIDELINES: HP SCANNER/OCR

POWER: NEMA 5-15R, 15 amp outlet.

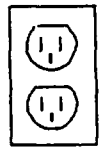
LOCATION: Must be directly connected to the supporting server, and is provided with a standard 6' cable.

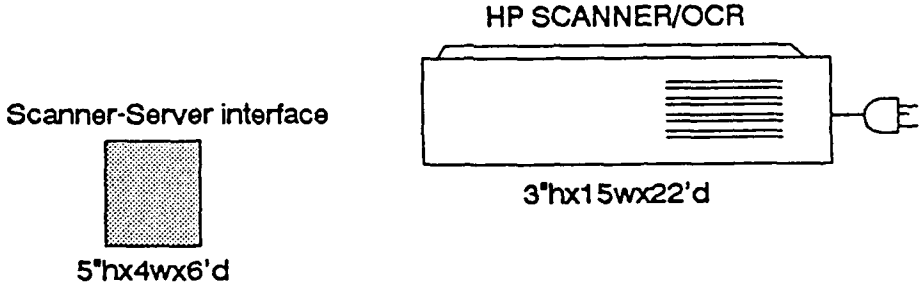
TEMPERATURE AND HUMIDITY: Must be between 60-90°F and 20%-80% humidity.

Equipment Specifications: HP SCANNER/OCR

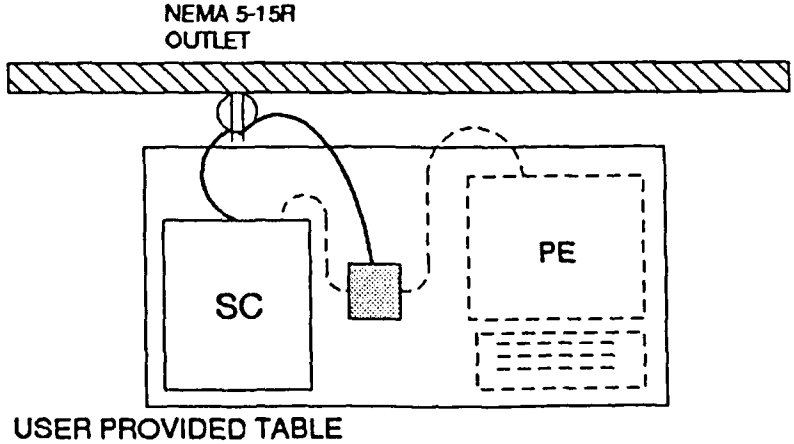
-Outlets required:	NEMA 5-15R, 15 amp outlet
-Amps:	4.21
-Power(KVA):	0.42
-Volts:	120
-BTU/Hr:	485
-Weight:	37 lbs.

NEMA 5-15R





TYPICAL LAYOUT
(Top View)



FORM: SC APR 92

Communications Equipment Cabinet
Specifications

EQUIPMENT GROUP CE
FIGURE B9

TECHNICAL GUIDELINES: COMMUNICATIONS CABINET (CE)

POWER: 15 amp, 120VAC circuit with one NEMA 5-15R outlet for the uninterruptable power supply (UPS).

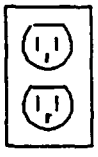
LOCATION: CE location will dictate the location of the network telephone data circuit. For LAN applications, CE's may be located 300' (cable length) from one another. Cabinets require minimum 3' clear for front and rear access.

TEMPERATURE AND HUMIDITY: Must be between 60-90 °F and 20%-80% humidity.

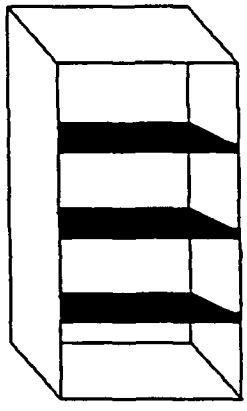
Equipment Specifications: COMMUNICATIONS EQUIPMENT FULL CABINET (CE)

-Outlets required:	15 amp, 120VAC circuit with a NEMA 5-15R outlet
-Amps:	8.00
-Power(KVA):	0.9
-Volts:	120
-BTU/Hr:	1,600
-Weight:	250 lbs.

NEMA 5-15R



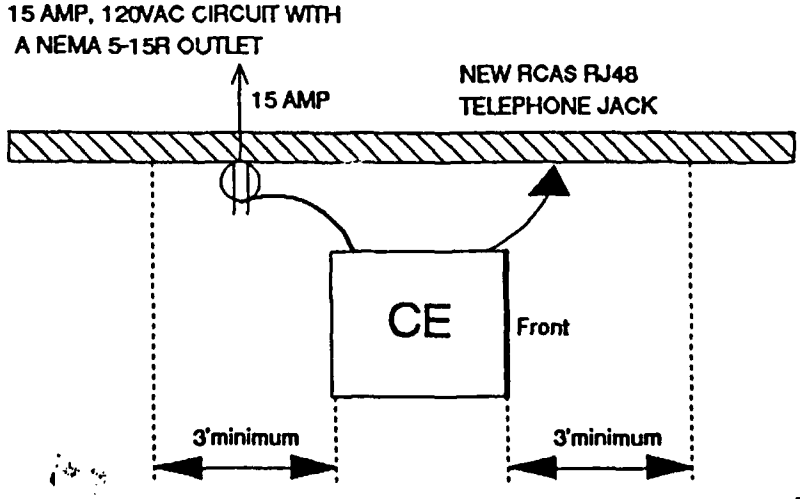
(CABINET MUST BE 3' FROM THE WALL.)



84"hx22w"x30"d

(Front View)

TYPICAL LAYOUT
(Top View)



FORM: CE APR 92

Appendix C

Echelon Equipment/Specification Summary

NOTES

Currently all printers will operate from a 486 Server and will not require a Jack, since LAN capability is not available. However, future technology enhancement may require a printer to operate from a LAN and need a Jack.

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 1

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	1	2	-	1	120	20.6	7699	4	3	25
2	1	2	-	1	120	20.6	7699	4	3	21
3	1	2	-	1	120	20.6	7699	4	3	21
4	1	2	-	1	120	20.6	7699	4	3	21
5	1	4	-	1	120	23.6	8929	6	5	27
6	1	5	-	1	120	25.1	9544	7	6	30

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 2

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	1	6	-	1	120	20.6	10159	8	7	27
2	1	8	-	1	120	29.6	11389	9	9	54

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 3

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	2	9	-	2	120	41.4	15504	13	11	74SF
2	2	10	-	2	120	50.1	19088	14	12	77

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 4

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	2	5	-	2	120	42.6	15398	9	7	62
2	2	4	-	2	120	41.1	15398	8	6	48
3	2	12	-	2	120	53.1	20318	16	14	72
4	2	12	-	2	120	53.1	20318	16	14	74
5	2	11	-	2	120	52	19703	15	13	69
6	4	55	2	8	120 & 240	193.6	75739	69	61	263
7	3	40	2	6	120 & 240	153.3	59960	51	45	208

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 5

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	1	2	-	1	120	20.6	7699	4	3	21
2	1	4	-	1	120	23.6	8929	6	5	27
3	1	6	-	1	120	26.6	10159	8	7	33
4	1	8	-	1	120	23.8	11384	10	9	27
5	2	10	-	2	120	50.1	19088	14	12	60

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 6

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	4	60	2	8	120 & 240	209	81726	74	66	286
2	5	70	2	10	120 & 240	242	85040	87	77	334

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 7

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	1	8	-	1	120	30	11389	10	9	39
2	2	10	-	2	120	50.1	19088	14	12	60
3	2	12	-	2	120	53.1	20318	16	14	66
4	2	12	-	2	120	53.1	20518	16	14	66

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 8

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	1	5	-	1	120	25.1	9544	7	6	30
2	1	6	-	1	120	26.6	10159	8	7	33
3	62	628	31	62	120	2541.6	894496	783	721	3289
4	64	648	32	64	120	2096	923192	808	744	3394
5	2	4	-	2	120	41.1	15398	8	6	42

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 9

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	2	14	2	4	120 & 240	134	54291	22	18	148
2	2	18	3	4	120 & 240	137	55521	27	23	150
3	3	35	3	4	120 & 240	170	69040	45	41	204
4	3	40	3	4	120 & 240	177.1	72115	50	46	206
5	3	45	3	4	120 & 240	185	75190	55	51	221
6	4	50	3	4	120 & 240	210	84874	61	57	265

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 10

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	2	27	2	4	120 & 240	147	52691	35	31	179
2	3	37	2	5	120 & 240	180	65395	47	42	280
3	4	55	2	6	120 & 240	245.1	89829	67	61	384
4	7	95	2	9	120 & 240	359	134091	113	104	576
5	9	125	2	11	120 & 240	440	165649	147	136	714
6	14	215	3	28	120 & 240	695	268921	260	232	1143

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 11

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	5	66	3	10	120 & 240	260	104210	84	74	431
2	5	71	3	10	120 & 240	260	104210	89	79	431

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 12

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	7	100	2	14	120 & 240	315	123076	123	109	526
2	4	60	2	6	120 & 240	201.1	78814	72	66	330
3	5	65	2	10	120 & 240	226.3	85508	82	72	369
4	4	55	2	8	120 & 240	194	72804	69	61	339
5	5	65	2	10	120 & 240	226.3	85508	82	72	369
6	4	55	2	8	120 & 240	194	72804	69	61	315

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 13

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	1	4	-	1	120	23.6	8929	6	5	34
2	1	6	-	1	120	26.6	10159	8	7	40
3	1	8	-	1	120	29.6	11389	10	9	46

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 14

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	2	32	-	2	120	83.1	32618	36	34	178

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 15

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	5	60	3	10	120 & 240	314	124312	78	68	481

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 16

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	24	100	4	48	120 & 240	767	288823	176	128	1109
2	-	-	-	-	-	-	-	-	-	-
3	4	TBD	2	8	120	135.3	43774	176	6	187
4	2	TBD	2	6	120	79.2	23856	10	4	108.5
5	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-
7	2	26	2	4	120 & 240	115	44796	34	30	184
8	7	100	2	14	120 & 240	315	123076	123	109	526
9	2	10	-	2	120	50.1	19088	14	12	89.5

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 17

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	43	665	6	86	120 & 240	1906	758367	800	714	3389
2	14	220	2	28	120 & 240	631	249086	264	236	1103

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 18

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	2	10	-	2	120	50.1	19088	14	12	74
2	2	11	-	2	120	51.6	51438	15	13	79
3	3	40	1	3	120	129	47465	47	44	209
4	2	16	-	2	120	59.1	17008	20	18	92

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 19

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	1	7	-	1	120	28.1	10774	9	8	43
2	1	8	-	1	120	30	11389	10	9	46
3	2	9	-	2	120	49	18473	13	11	71

TABLE C1

EQUIPMENT/SPECIFICATION SUMMARY

ECHELON 20

CATEGORY	SERVERS	X-TERMS	DECS	PRINTERS	VOLTS	AMPS	HVAC	OUTLETS	LAN JACKS	AREA
1	44	694	8	88	120 & 240	2077	810456	834	746	3751
2	16	250	2	32	120 & 240	707.2	277224	300	268	1254
3	2	25	2	2	120 & 240	121	46923	31	29	189

Appendix D

RCAS Issue Plan

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Echelon 1: Company (Companies, HHC, HHD, Batteries, Troops, Detachments, and Detachments of Companies (e.g., Det–1, A Company), Reinforced Platoon, Bands, Sections)

Category	Criteria (Authorized Strength)	Est # of Units	X–Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
*1	2–14	703	1	703	1	703	0	0	0	0
2	15–24	807	1	807	1	807	1	807	0	0
3	25–49	869	2	1738	1	869	1	869	0	0
4	50–75	1286	2	2572	1	1286	1	1286	0	0
5	76–249	3181	4	12724	1	3181	1	3181	0	0
6	250 Plus	108	5	540	1	108	1	108	0	0
Totals:		6954		19084		6954		6251		0

Validation documents used: NGB Pam 570–1; NGB and USAR Full Time Manning Documents.

Categories:	Authorized Strength:	Recommended Distribution:
1. Split Element Strength:	2–14	No full time staff
2. Authorized Strength: or Split Element Strength:	15–24 50–124	Readiness NCO/Unit Administrator, Tng NCO
3. Authorized Strength: or Split Element Strength:	25–49 +125	RNCO/UA, Tng NCO, Supply NCO
4. Authorized Strength: (includes separate MTOE detachments)	50–75	RNCO/UA, Tng NCO, Supply NCO
5. Authorized Strength: (includes separate MTOE detachments)	76–249	RNCO/UA, Tng NCO, Supply NCO, Admin NCO, Asst Tng NCO
6. Authorized Strength:	+250	RNCO/UA, Tng NCO, Supply NCO, 2 each Admin NCO, Asst Tng NCO

* *Category 1 units will receive equipment only if they are "AA" UIC organizations.*

*Organizations in this Echelon will receive the following software:

Word Processing, Spreadsheet, Database, E–mail. Note: Echelons that receive bar code reader(s) will also receive bar code printing software on one OA server

Echelon 2: Battalions (Battalion, Troop Cmd Bn, Squadrons, Maneuver Tng Cmd, Reception BN, US Army Hospital)

Category	Criteria (Type of Organization)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers Readers	Total	Laptop	Total
1	Tng Battalion	160	6	960	1	160	0	0	1	160
2	All Other BNs	1135	6	9080	1	1135	1	1135	1	1135
3				0		0		0		0
4				0		0		0		0
5				0		0		0		0
6				0		0		0		0
Totals:		1295		10040		1295		1135		1295

Validation documents used: NGB Pam 570-1, NGB and USAR Full Time Manning Document

Categories:		Authorized Staffing:	Recommended Distribution:
1.	Training Battalion	6	Unit Technicians, Supply Technicians, Training Officers, or Equivalents
2.	Batallions	11	XO/S3, S1/AS3, Operations NCO, Personnel Specialist NCO, S4, Supply NCO, 2 each Personnel Administration Specialists, NBC NCO, 2 additional Personnel Specialists

Organizations in this Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, E-mail. Echelons that receive bar code readers will also receive bar code printing software on one OA server.

Echelon 3: Brigades (Brigades, Groups, Div Artillery, DISCOM, Hospitals (1,000 bed))

Category	Criteria (Type of Organization)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	Brigade, Tng	41	9	369	2	82	1	41	2	82
2	All Other Bde	80	10	800	2	160	1	80	2	160
3				0		0		0		0
4				0		0		0		0
5				0		0		0		0
6				0		0		0		0
Totals:		121		1169		242		121		242

Validation documents used: NGB Pam 570-1, NGB and USAR Full Time Manning Documents.

Categories:		Authorized Staffing:	Recommended Distribution:
1.	Brigade, Tng	9	XO/S3, S1/AS3, Operations NCO, Personnel Specialist NCO, S4, Supply NCO, 2 each Personnel Administration Specialists, Clerk Typist Specialist
2.	Brigades	10-12	Category 1 + NBC NCO, 2 Additional Personnel Admin Specialists

Organizations in this echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, Project Management, E-mail. Note: Echelons that receive bar code readers will also receive bar code printing software on one OA sen

Echelon 4: Divisions (DMsions, DMsions (Training), Rear Area Operations Centers (RAOC), Regiments, Separate Brigades, Troop Commands (ARNG only), General Officer Commands (GOCOMs) below MUSARC levels)

Category	Criteria (Type of Organization)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers Readers	Total	Laptops RCAS	Total RCAS
1	RAOCs	10	5	50	2	20	1	10	2	20
2	RTOC	75	4	300	2	150	1	75	2	150
3	GOCOMs	44	12	528	2	88	2	88	2	88
4	Troop Cmds, Regiments	60	12	720	2	120	2	120	2	120
5	Sep. Brigade	20	11	220	2	40	2	40	2	40
7	DMsion,MTOE	10	40	400	3	30	0	0	2	20
Totals:		219		2218		448		333		438

Validation documents used: NGB Pam 570-1; NGB and USAR Full Time Manning Documents.

Categories:		Authorized Staffing:	Recommended Distribution:
1.	RAOCs	5	G3, G1, G4, Training NCO, Personnel Admin Specialist
2.	RTOCs	5	G3, G1, G4, Training NCO, Personnel Admin Specialist
3.	GOCOMs	12-25	Chief of Staff, G3, G1, G4, Training NCO, Transportation NCO, 3 Personnel Admin Specialists, G2, 2 each Clerk Typists
4.	Troop Cmds, Regiments	12	Chief of Staff, G3, G1, G4, Training NCO, Transportation NCO, 3 Personnel Admin Specialists, G2, 2 each Clerk Typists
5.	Sep. Brigade	14	Chief of Staff, G3, G1, G4, Training NCO, Transportation NCO, 3 Personnel Admin Specialists, G2, 2 each Clerk Typists, NBC NCO, Chief Operations NCO
6.	DMsion,MTOE	21	Chief of Staff, G3, G1, G4, Training NCO, Transportation NCO, 4 Personnel Admin Specialists, G2, 3 each Clerk Typists, NBC NCO, Chief Operations NCO, Training Operations Officer, Assistant G4, Personnel NCO, Legal Clerk,

Organizations in this Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, E-mail,
Note: Echelons that receive bar code readers will also receive bar code printing software on one OA server.

Echelon 5: Small Equipment Storage Sites (ES/MS)

(The echelon includes, but is not limited to: Area Maintenance Support Activities (AMSA), Organizational Maintenance Shops (OMS), Mobilization and Training Equipment Sites (MATES) (without support), Unit Training Equipment Sites (UTES), Equipment Concentration Sites (ECS))

Category	Criteria (Auth Full Time Manning)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	2-10	922	2	1844	1	922	1	922	0	0
2	11-25	165	4	660	1	165	1	165	0	0
3	26-55	14	6	84	1	14	2	28	0	0
4	56-90	3	8	24	1	3	2	6	0	0
5	91+	2	10	20	2	4	2	4	0	0
6				0		0		0		0
Totals:		1106		2632		1108		1125		0

Validation documents used: NGB Pam 570-1, NGB and USAR Full Time Manning Documents.

Categories:	Authorized Full Time Manning:	Recommended Distribution:
1.	2-10	Main Office, Property Section
2.	11-25	Main Office, Property Section, Shop Control Office, Equipment Record Section
3.	26-55	Main Office, Property Section, Shop Control Office, Equipment Record Section, Repair Parts-Tools and POL, Organizational Maintenance Section
4.	56-90	Main Office, Property Section, Shop Control Office, Equipment Record Section, Repair Parts-Tools and POL, Organizational Maintenance Section, Mechanical Equipment Repair Section, Shop Control Office
5.	91+	Main Office, Property Section, Shop Control Office, Equipment Record Section, Repair Parts-Tools and POL, Organizational Maintenance Section, Mechanical Equipment Repair Section, Shop Control Office, Armament Repair Section, Quality Control Section

Organizations in this Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, E-mail.

Echelon 6: State Operated Mobilization Stations (SOMS)

Category	Criteria (Type of Organization)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptop P: RCAS	Total RCAS
1	B	1	60	60	4	4	0	0	2	2
2	A	8	70	560	5	40	0	0	2	16
3				0		0		0		0
4				0		0		0		0
5				0		0		0		0
6				0		0		0		0
Totals:		9		620		44		0		18

Validation documents used: NGB Pam 570-1, NGB Full Time Manning Documents.

Catagory:	Recommended Distribution:
A and B	Office of Site Manager, Directorate of Personnel and Community Affairs, Directorate of Plans Training and Mobilization, Operations and Training Division, Range Division, Mobilization Division, Directorate of Logistics, Supply Division, Ammunition Supply and Storage Division, Troop Subsistance Division, Housing Division, Directorate of Resource ManagementDirectorate of Facilities Engineering, Engineering Plants and Service Division, Engineering Resource Management Division, Supply and Storage Division and Trades Activities

Category A: Camp Robinson AR, Camp Roberts CA, Camp Blanding FL, Atterbury RFTA IN, Camp Edwards MA, Camp Grayling MI, Camp Riley MN, Camp Shelby MS

Category B: Gowen Field ID

Organizations in this Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, E-mail. Note: Echelons that receive bar code readers will also receive bar code printing software on one OA server.

Echelon 7: ***Army Aviation Support Facilities***

(Army Aviation Support Facility (AASF), Army Aviation Flight Activity (AFA), Aviation Classification Repair Activity Depot (AVCRAD)
(Includes Western and Eastern Army Aviation Training Sites)

Category	Criteria (Type of Organization)	Est # of Units	X-Terms	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	AFA	53	8	424	1	53	1	53	0	0
2	EAATS/WAATS	2	10	20	2	4	3	6	0	0
3	AASF	41	12	492	2	82	3	123	0	0
4	AVCRAD	6	12	72	2	12	3	18	0	0
5				0		0		0		0
6				0		0		0		0
Totals:		102		1008		151		200		0

Validation documents used: NGB Pam 570-1, NGB and USAR Full Time Manning Documents.

Categories:	Types of Organization	Recommended Distribution:
1.	AFA	Commanders Office, Training Branch, Maintenance Shops
2.	EAATS/WAATS	Commanders Office, Training Branch, Operations Branch
3.	ASF	Commanders Office, Training Branch, Maintenance Shops, Aircraft Repair Section, Allied Shops, Quality Control, Production Support
4.	AVCRAD	Commanders Office, Training Branch, Operations Branch, Depot Maintenance Section

Organizations in this Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, E-mail. Note: Echelons that receive bar code reader(s) will also receive bar code printing software.

Echelon 8: Small Schools (State Military Academies, United States Army Reserve Schools (USAR), Professional Education Center (ARNG), Army Reserve Readiness Training Center (ARRTC), Maneuver Tng Cmds)

Category	Criteria (School)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	State Mil Acad	50	5	250	1	50	0	0	0	0
2	USAR School	90	6	540	1	90	1	90	0	0
3	PEC	1	628	628	62	62	10	10	5	5
4	ARRTC	1	648	648	64	64	10	10	5	5
5	MTC, USAR	12	12	144	2	24	0	0	0	0
6				0		0		0		0
Totals:		154		2210		290		110		10

Validation documents used: NGB Pam 570-1; NGB and USAR Full Time Manning Documents; Appendix U, Workload Analysis, Para C.4.34.4, DAHC 94-91-C-0002

Categories:	Types of Organization	Recommended Distribution:
1.	State Mil Academies	Training Administrator, Training Specialist, Operations NCO, Supply NCO, Administrative Specialist
2.	USAR School	Training Administrator, Training Specialist, Operations NCO, Supply NCO, Administrative Specialist, Admin NCO
3.	PEC	Per Paragraph C.4.34.4, DAHC 94-91-C-0002
4.	ARRTC	Per Paragraph C.4.34.4, DAHC 94-91-C-0002

Organizations in this Echelon will receive the following software;
Word Processing, Spreadsheet, Database, Presentation Graphics, E-mail. Note: Echelons that receive bar code reader(s) will also recieve bar code printing software.

Echelon 9: United States Property Book and Fiscal Office

Category	Criteria (Auth CMD Strength)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	500-1499	2	16	32	2	4	0	0	2	4
2	1500-2999	5	18	90	2	10	0	0	2	10
3	3000-5999	15	35	525	3	45	0	0	2	30
4	6000-9999	12	40	480	3	36	0	0	2	24
5	10,000-17999	15	45	675	3	45	0	0	2	30
6	18,000+	5	50	250	4	20	0	0	2	10
Totals:		54		2052		160		0		108

Validation documents used: NGB Pam 570-1; NGB and USAR Full Time Manning Documents

Category:	Authorized Strength:	Recommended Distribution:
1.	500-9999	Office of USPFO, Supervisor of Logistics Management, Administration, Comptroller Division, Logistics Division, Analysis and Internal Review Division, Data Processing Division, Purchasing and Contracting Division Warehouse Operations
2.	10,000+	Same as Category 1

Organizations in this Echelon will receive the following software;
Word Processing, Spreadsheet, Database, Presentation Graphics, Project Management, Desk Top publishing, E-mail.

Echelon 10: State Area Commands (STARC) (less USPFO, AASF, HHC STARC)

(50 STARCs, Territories of Guam, Puerto Rico, and Virgin Islands, and the District of Columbia)

Category	Criteria (Authorized Strength)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	500-1499	2	30	60	2	4	0	0	3	6
2	1500-2999	5	40	200	3	15	0	0	3	15
3	3000-5999	15	60	900	8	120	0	0	3	45
4	6000-9999	12	100	1200	7	84	0	0	3	36
5	10,000-17,999	15	130	1950	9	135	0	0	3	45
6	18,000+	5	220	1100	14	70	0	0	3	15
Totals:		54		5410		428		0		162

Validation documents used: NGB Pam 570-1; NGB and USAR Full Time Manning Documents

Category:	Authorized Strength:	Recommended Distribution:
1.	500-7999	Office of Adjutant General, Inspector General Office, Support Personnel Management Office, Command Administrative Office, Special Offices, Military personnel Management Office, Plans Operations and Training Office, State Aviation Office, State Maintenance Office, Directorate of Logistics, Construction and Facilities Office, Information Management Office
2.	8,000-16,999	Same as Category 1
3.	17,000-24,000	Same as Category 1

Notes:

1. Numbers of workstations may increase as number of STARC organizational locations increases.

2. Number of workstations will increase based on additional organizations assigned, i.e., ARNG Multi-Media Center, Duplicating and Forms Center, Eastern and Western Army Aviation Training Sites, Marksmanship Training Units.

3. HHD STARC and State Military Academies are supported as Echelon 1 organizations. Aviation Facilities are supported as Echelon 7 organizations. USPFO is supported as an Echelon 9 organization.

Organizations in this Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, E-mail, Desktop Publishing, Desktop Organizer, Project Manager, Map Graphics, Computer Aided Design

Echelon 11: Support Installation/Mobilization Station (SI/MS) (Active Army Mobilization Station)

Catagory	Criteria (Type of Organization)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	FORSCOM	28	66	1848	5	140	0	0	11	308
2	TRADOC	14	66	924	5	70	0	0	11	154
3				0		0		0		0
4				0		0		0		0
5				0		0		0		0
6				0		0		0		0
Totals:		42		2772		210		0		462

Validation documents used: Appendix U (Workload Analysis) catagories the Peacetime Concurrent users as 173 during Peak Mobilization usage.

Organizations in this Echelon receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, E-Mail, Desktop Organizer, Project Manager.

Echelon 12: Major Army Reserve Commands (MUSARC)

Category	Criteria (Type of Organization)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	ARCOM	20	100	2000	7	140	0	0	5	100
2	TAACOM	2	60	120	4	8	0	0	3	6
3	COSCOM	2	65	130	5	10	0	0	3	6
4	ENCOM	4	55	220	4	16	0	0	3	12
5	NAAD	1	65	65	5	5	0	0	3	3
6	MAC	2	55	110	4	8	0	0	3	6
7	Tng. Division	12	55	660	4	48	0	0	2	24
8				0		0		0		0
Totals:		43		3305		235		0		157

Validation documents used: USAR Full Time Manning Documents

Category:	Type of Organization	Recommended Distribution:
1.	ARCOM	Command Section, DCS Personnel, DCS Operations, DCS Training, DCS Logistics, DCS Resource Management, DCS Information Management, Inspector General, Staff Judge Advocate, Surgeon, Dental Surgeon, Chaplain, Public Affairs Office, Internal Revenue Office, Engineer
2.	TAACOM	Same as Category 1
3.	COSCOM	Same as Category 1
4.	ENCOM	Same as Category 1
5.	NAAD	Same as Category 1
6.	MAC	Same as Category 1
7.	Tng Division	Chief of Staff, G3, G1, G4, Training NCO, Transportation NCO, 4 Personnel Admin Specialists, G2, 2 each Clerk Typists, NBC NCO, Chief Operations NCO, Training Operations Officer, Assistant G4, Personnel NCO, Legal Clerk

Organizations in this Echelon receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, Desktop Organizer, Project Manager, Desktop Publishing.

Echelon 13: State Operated Training Sites *(See catagory listings below)*

Category	Criteria (Type of Organization)	Full Time Staff	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	C, D, E	4-9	29	4	116	1	29	0	0	0	0
2	B	27	2	6	12	1	2	0	0	0	0
3	A	67	10	8	80	1	10	0	0	0	0
4	(See note				0		0		0		0
5	below)				0		0		0		0
6					0		0		0		0
Totals:			41		208		41		0		0

Validation documents used: NGB Pam 570-1, NGB Full Time Manning Documents.

A: Camp Robinson AR, Camp Roberts CA, Camp Blanding FL, Atterbury RFTA IN, Camp Edwards MA, Camp Grayling MI, Camp Riley MN, Camp Shelby MS Fort Stewart GA (ARNG Element), Camp Gruber OK

B: Gowen Field ID, Camp Smith NY

C: Fort McClellan (ARNG Element), Camp O'Neill CT, Camp Dodge IA, Camp Beauregard LA, Camp Custer MI, Camp Grafton ND, Camp Perry OH, Camp Rilea OR

D: Camp Carrol AK, Navajo Army Depot AZ, Camp Marseilla IL, Riley-Bog Brook ME, Fort Harrison MT, Camp Clark MO, Camp Crowder MO, Camp McCain MS, Fort Sill (ARNG Element) OK

E: Florance Military Reservation AZ, Fort Huachuca AZ (ARNG Element), Camp West CO, Nickell Barracks KS, Eastern Kentucky Training Site, Camp Curtis Guild MA, Gunpowder Military Reservation MD, Camp Butner NC, Camp Hastings NE, Camp Ashland NE, Fort Dix (Sea Grit) NJ, Stead Training Site NV

Category:	Organization:	Recommended Distribution:
1.	C, D, E	Site Manager's Office, Training Division, Logistics Division, Engineering
2.	B	Category 1 + Range Branch, Supply Branch
3.	A	Category 2 + Trades Activities, Resource Management, Housing Division, Ammunition Division

Notes:

Users at this echelon could include: Office of Site Manager, Directorate of Personnel and Community Affairs, Directorate of Plans Training and mobilization, Operations and Training Division, Range Division, Mobilization Division, Directorate of Logistics, Supply Division, Ammunition Supply and Storage Division, Troop Issue Subsistance Division, Housing Division, Directorate of Resource Management, Directorate of Facilities Engineering, Engineering Plants and Service Division, Engineering Resource Management Division, Supply and Storage Division and Trades Activities

Organizations in this Echelon will receive the following software:
Word Processing, Spreadsheet, Database, E-mail.

Echelon 14: Readiness Groups (RG)

Catagory	Criteria (Type of Organization)	Full Time Staff	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	RG	50-150	29	32	928	2	58	0	0	16	464
2					0		0		0		0
3					0		0		0		0
4					0		0		0		0
5					0		0		0		0
6					0		0		0		0
Totals:			29		928		58		0		464

Validation documents used: Readiness Group MTOE and Workload Analysis Exhibit V.4.14-2, page U-130 identifies 13 concurrent users in Column H.
(Readiness Group Internal Support REGIS application)

Category:	Organization:	Recommended Distribution:
1.	Readiness Group	Senior Army Advisor, Operations and Training Section, Centralized Aviation Readiness Teams, Evaluation Sections

Organizations in this Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, Project Management, E-mail.

Echelon 15: Continental Unites States Army (CONUSA)

(First US Army, Second US Army, Fourth US Army, Fifth US Army, Sixth US Army)

Catagory	Criteria (Type of Organization)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	US Army	4	66	264	5	20	0	0	2	8
2				0		0		0		0
3				0		0		0		0
4				0		0		0		0
5				0		0		0		0
6				0		0		0		0
Totals:		4		264		20		0		8

Validation documents used: MTOE for CONUSA; Appendix U Workload Analysis

Organizations in the Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, E-mail, Desktop Organizer, Project Manager, Desktop Publishing, Map Graphics, Computer Aided Design (CAD).

Echelon 16: Major Command (MACOM)

Category	Criteria (Type of Organization)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	FORSCOM	1	106	106	24	24	2	2	2	2
2	TRADOC	1	0	0	0	0	0	0	0	0
3	USARPAC	1	3	3	4	4	0	0	2	2
4	USAREUR	1	1	1	2	2	0	0	2	2
5	AMC	1	0	0	0	0	0	0	0	0
6	ISC	1	0	0	0	0	0	0	0	0
7	USASFC	1	26	26	2	2	0	0	5	5
8	USACAPOC	1	100	100	12	12	0	0	5	5
9	USASOIC	1	10	10	1	1	0	0	5	5
10	HSC	1	0	0	0	0	0	0	0	0
Totals:		10		246		45		2		21

Validation documents used: Appendix U, Workload Analysis

Organizations in this Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, E-mail, Desktop Organizer, Project Manager, Desktop publishing.

Echelon 17: National Guard Bureau (NGB)

Category	Criteria (Type of Organization)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	Arlington Hall	1	665	665	43	43	0	0	80	80
2	Pentagon	1	220	220	14	14	0	0	20	20
Totals:		2		885		57		0		100

Validation documents used: Appendix U, Workload Analysis

Notes:

1. Numbers of users for NGB is defined in Para C.1.34.4, Modification P00009 of DAHC 94-91-C-0002.

2. Number of workstations will increase based on additional organizations assigned, i.e., ARNG multi-Media Center, Duplicating and Forms Center, Eastern and Western Army Aviation Training Sites, Marksmanship Training Units.

Organizations in this Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, Desktop Organizer, Project Manager, Desktop Publishing, E-mail.

Echelon 16: Large Schools (Regional Training Sites (RTS) (ARNG only), NCOES, Regional TNG Site; Medical, Maintenance, NCO)

Category	Criteria (Type of Organization)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	NCOES	4	10	40	2	8	0	0	0	0
2	RTS	6	11	66	2	12	2	12	0	0
3	NICI	1	40	40	3	3	0	0	0	0
4	RTS-Medical	5	16	80	2	10	3	15	0	0
5				0		0		0		0
6				0		0		0		0
Totals:		16		226		33		27		0

Category:	Organization:	Recommended Distribution:
1.	NCOES	Training Section, Operations Section, Supply Section, Administrator
2.	RTS	Same as Category 1

Organizations in this Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, E-mail.

Echelon 19: Equipment Storage and Maintenance Sites (Surface Equipment)

(Combined Support Maintenance Shops (CSMS), Mobilization and Training equipment Site (MATES) (with support))

Category	Criteria (Major End Item Density)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	1-4,999	21	7	147	1	21	5	105	0	0
2	5,000-9,999	17	8	136	1	17	5	85	0	0
3	10,000+	54	9	486	2	108	5	270	0	0
4				0		0		0		0
5				0		0		0		0
6				0		0		0		0
Totals:		92		769		146		460		0

Validation documents used: NGB Pam 570-1; NGB and USAR Full Time Manning Documents

Category:	Recommended Distribution:
1.	Main Office, Shop Control Office, Repair Parts, Tools and POL Section, Equipment Records section, Organizational Maintenance Section, Property Accountability and warehouse Section.
2.	Same as Category 1
3.	Same as Category 1

Organizations in this Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, E-mail.

Echelon 20: Top of the System Users United States Army Reserve Command (USARC)

Catagory	Criteria (Type of Organization)	Est # of Units	X-Terminals	Total	Printers	Total	Bar Code Readers	Total	Laptops	Total
1	USARC	1	700	700	44	44	0	0	150	150
2	OCAR (Roslind/Pentagon)	1	250	250	16	16	0	0	24	24
3	DCSOPS	1	25	25	2	2	0	0	1	1
4	ARPERCEN	1		0		0		0		0
5				0		0		0		0
6				0		0		0		0
Totals:		4		975		62		0		175

Validation documents used: Appendix U, Workload Analysis

Notes:

Numbers of users for USARC is defined in Para C.1.34.4, Modification P00009 of DAHC 94-91-C-0002.

Organizations in the Echelon will receive the following software:
Word Processing, Spreadsheet, Database, Presentation Graphics, E-mail, Desktop Organizer, Project Manager, Desktop Publishing, Map Graphics.
Note 1: Map Graphics software only provided to USARC echelon
Note 2: USARC receives computer aided design (CAD) software.
Note 3: OCAR and DA DCSOPS do not receive either map graphics or CAD software

Totals for Echelons 1 through 20

Echelon Number:		Estimated # of units	X-Terms	Printers	Bar Code	Laptops
Echelon 1	Company	6954	19084	6954	6251	0
Echelon 2	Batallion	1295	10040	1295	1135	1295
Echelon 3	Brigade	121	1169	242	121	242
Echelon 4	Division	219	2218	448	333	438
Echelon 5	ES/MS	1108	2632	1108	1125	0
Echelon 6	SOMS	9	620	44	0	18
Echelon 7	AASF	102	1008	151	200	0
Echelon 8	Small School	154	2210	290	110	10
Echelon 9	USPFO	54	2052	160	0	108
Echelon 10	STARC	54	5410	428	0	162
Echelon 11	SI/MS	42	2772	210	0	462
Echelon 12	MUSARC	43	3305	235	0	157
Echelon 13	SOTS	41	208	41	0	0
Echelon 14	RG	29	928	58	0	464
Echelon 15	CONUSA	4	264	20	0	8
Echelon 16	MACOM	10	246	45	2	21
Echelon 17	NGB	2	885	57	0	100
Echelon 18	Large School	16	226	33	27	0
Echelon 19	ESMS	92	769	146	460	0
Echelon 20	Top Users	4	975	62	0	175
Totals:		10351	57021	12027	9784	3660

Appendix E

Echelon Equipment/Specification Table

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TABLE E

ECHELON 1-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
2drawer-Safe	-	-	-	5.5 SF
P1	120	10.3	3500	19 SF
XRC	120	1.5	615	2 SF
HPIII	120	7.25	2969	3 SF
Port Bar	-	-	-	-
XR	120	1.5	615	3 SF
TOTAL	120	20.55	7699	32.5 SF

TABLE E

ECHELON 1-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P1	120	10.3	3500	19 SF
XR	120	1.5	615	3 SF
XRC	120	1.5	615	2 SF
HP-III	120	7.25	2969	3 SF
Bar Port	-	-	-	-
TOTAL	120	20.55	7699	27 SF

TABLE E

ECHELON 1-3 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P1	120	10.3	3500	19 SF
XRC	120	1.5	615	2 SF
HP-III	120	7.25	2969	3 SF
PORT BAR	-	-	-	-
XR	120	1.5	615	3 SF
TOTAL	120	20.55	7699	27 SF

TABLE E

ECHELON 1-4 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P1	120	10.3	3500	19 SF
XRC	120	1.5	615	2 SF
HP-III	120	7.25	2969	3 SF
PORT BAR	-			
XR	120	1.5	615	3 SF
TOTAL	120	20.55	7699	27 SF

TABLE E

ECHELON 1-5 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P2	120	10.3	3500	19 SF
XRC	120	1.5	615	2 SF
(3) XR	120	4.5	1845	9 SF
HP-III	120	7.25	2969	3 SF
PORT BAR	-	-	-	-
TOTAL	120	23.55	8929	33 SF

TABLE E

ECHELON 1-6 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P3	120	10.3	3500	19 SF
(4) XR	120	6	2460	12 SF
XRC	120	1.5	615	2 SF
HP-III	120	7.25	2969	3 SF
PORT BAR	-	-	-	-
TOTAL	120	25.05	9544	36 SF

TABLE E

ECHELON 2-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
2DRAWER-SAFE	-	-	-	5.5 SF
P3	120	10.3	3500	19 SF
PLT-LAPTOP	AC/DC	-	-	2 SF
(5) XR	120	1.5	3075	3 SF
XRC	120	1.5	615	2 SF
HP-III	120	7.25	2969	3 SF
TOTAL	120	20.55	10159	34.5 SF

TABLE E

ECHELON 2-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
2DRAWER-SAFE	-	-	-	5.5 SF
PLT-LAPTOP	AC/DC	-	-	2 SF
(7) XR	120	10.5	4305	21 SF
XRC	120	1.5	615	2 SF
HP-III	120	7.25	2969	3 SF
PORT-BAR	-	-	-	-
P4	120	10.3	3500	19 SF
TOTAL	120	29.55	11389	52.5 SF

TABLE E

ECHELON 3-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
2DRAWER-SAFE	-	-	-	5.5 SF
P1	120	10.3	3500	19 SF
P4	120	10.3	3500	19 SF
(2) PLT	AC/DC	-	-	4 SF
(7) XR	120	10.5	4305	21 SF
(2) XRC	120	3.0	1230	4 SF
(2) HP-III+	120	7.25	2969	6 SF
TOTAL	120	41.35	15504	78.5 SF

TABLE E

ECHELON 3-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
2DRAWER-SAFE	-	-	-	5.5 SF
P1	120	10.3	3500	19 SF
P4	120	10.3	3500	19 SF
(2) PLT	AC/DC	-	-	4 SF
(8) XR	120	12	4920	24 SF
(2) XRC	120	3	1230	4 SF
(2) HP-III +	120	14.5	5938	6 SF
TOTAL	120	50.1	19088	81.5 SF

TABLE E

ECHELON 4-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
PORT-BAR	-	-	-	-
2DRAWER SAFE	-	-	-	5.5 SF
P1	120	10.3	3500	19 SF
P2	120	10.3	3500	19 SF
(2) PLT	AC/DC	-	-	4 SF
XR	120	1.5	615	3 SF
(2) XRC	120	3.0	1230	4 SF
(2) XRL	120	3.0	615	6 SF
(2) HP-SI	120	14.5	5938	6 SF
TOTAL	120	42.6	15398	66.5 SF

TABLE E

ECHELON 4-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
PORT-BAR	-	-	-	-
2DRAWER SAFE	-	-	-	5.5 SF
P1	120	10.3	3500	19 SF
P2	120	10.3	3500	19 SF
(2) PLT	AC/DC	-	-	4 SF
(2) XRC	120	3.0	1230	4 SF
(2) XRL	120	3.0	1230	4 SF
(2) HP-SI	120	14.5	5938	6 SF
TOTAL	120	41.1	15398	61.5 SF

TABLE E

ECHELON 4-3 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) PORT-BAR	-	-	-	-
2DRAWER SAFE	-	-	-	5.5 SF
P2	120	10.3	3500	19 SF
(2) PLT	AC/DC	-	-	4 SF
(8) XR	120	12	4920	24 SF
(2) XRC	120	3	1230	4 SF
(2) XRL	120	3	1230	4 SF
(2) HP-SI	120	14.5	5938	6 SF
P4	120	10.3	3500	19 SF
TOTAL	120	53.1	20318	85.5 SF

TABLE E

ECHELON 4-4 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) PORT BAR	-	-	-	-
2DRAWER SAFE	-	-	-	5.5 SF
P2	120	10.3	3500	19 SF
(2) PLT	AC/DC	-	-	4 SF
(8) XR	120	12	4920	24 SF
(2) XRC	120	3	1230	4 SF
(2) XRL	120	3	1230	6 SF
(2) HP-SI	120	14.5	5938	6 SF
P4	120	10.3	3500	19 SF
TOTAL	120	53.1	20318	87.5 SF

TABLE E

ECHELON 4-5 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) PORT BAR	-	-	-	-
2DRAWER SAFE	-	-	-	5.5 SF
P2	120	10.3	3500	19 SF
(2) PLT	AC/DC	-	-	4 SF
(7) XR	120	10.5	4305	21 SF
(2) XRC	120	3	1230	4 SF
(2) XRL	120	3	1230	4 SF
(2) HP-SI	120	14.5	5938	6 SF
P4	120	10.3	3500	19 SF
TOTAL	120	51.6	19703	82.5 SF

TABLE E

ECHELON 4-6 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
2DRAWER SAFE	-	-	-	5.5 SF
(2) PLT	AC/DC	-	-	-
(49) XE	120	73.5	30135	147 SF
(4) XEC	120	6	2460	12 SF
(2) XEL	120	3	1230	6 SF
(2) HP-III +	120	14.5	5938	6 SF
(4) LOW PRT	120	.84	340	8 SF
(2) HP-SI	120	14.5	5938	6 SF
P4	120	10.3	3500	19 SF
DEC-E	120	16	3458	19 SF
DEC-F	240	24	12240	19 SF
(3) P6	120	30.9	10500	57 SF
TOTAL	120	193.54	75739	304.5

TABLE E

ECHELON 4-7 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
2DRAWER SAFE	-	-	-	5.5 SF
(2) PLT	AC/DC	-	-	4 SF
(35) XE	120	52.5	21525	105 SF
(3) XEC	120	4.5	1845	9 SF
(2) XEL	120	3	1230	6 SF
HP-III +	120	7.25	2969	3 SF
(3) LOW PRT	120	.63	255	6 SF
(2) HP-SI	120	14.5	5938	6 SF
P4	120	10.3	3500	19 SF
DEC E	120	16	3458	19 SF
DEC F	240	24	12240	19 SF
(2) P6	120	20.6	7000	38 SF
TOTAL	120	153.28	59960	239.5

TABLE E

ECHELON 5-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
PORT BAR	-	-	-	-
P1	120	10.3	3500	19 SF
XR	120	1.5	615	3 SF
XRC	120	1.5	615	2 SF
HP-III	120	7.25	615	3 SF
TOTAL	120	10.55	7699	27 SF

TABLE E

ECHELON 5-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
PORT BAR	-	-	-	-
(3) XR	120	4.5	1845	9 SF
XRC	120	1.5	615	2 SF
HP-III	120	7.25	2969	3 SF
P2	120	10.3	3500	19 SF
TOTAL	120	23.55	8989	33 SF

TABLE E

ECHELON 5-3 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) PORT BAR	-	-	-	-
(5) XR	120	7.50	3075	15 SF
XRC	120	1.50	615	2 SF
HP-III	120	7.25	2969	3 SF
P3	120	10.3	3500	19 SF
TOTAL	120	26.55	10159	39 SF

TABLE E

ECHELON 5-4 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) PORT BAR	-	-	-	-
(7) XR	120	10.5	4305	21 SF
XRC	120	1.5	615	3 SF
HP-III	120	7.25	615	2 SF
P4	120	10.3	3500	19 SF
TOTAL	120	29.6	11384	33 SF

TABLE E

ECHELON 5-5 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) PORT BAR	-	-	-	-
P1	120	10.3	3500	19 SF
P4	120	10.3	3500	19 SF
(8) XR	120	12	4920	24 SF
(2) XRC	120	3	1230	4 SF
(2) HP-III	120	14.5	5938	6 SF
TOTAL	120	50.1	19088	72 SF

TABLE E

ECHELON 6-1				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-C	240	24	9305	27 SF
DEC-L	240	24	9305	27 SF
4DRAWER SAFE	-	-	-	10 SF
P4	120	10.3	3500	19 SF
(3)P6	120	30.9	10500	57 SF
(2) PLT	120	-	-	4 SF
(56) XE	120	84	34440	168 SF
(4) XEC	120	6	2460	12 SF
(4) HP-III +	120	29	11876	12 SF
(4) LOW PRT	120	.84	340	8 SF
TOTAL				344 SF

TABLE E

ECHELON 6-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-C	240	24	9305	27 SF
DEC-L	240	24	9305	27 SF
4DRAWER SAFE	-	-	-	10 SF
P4	120	10.3	3500	19 SF
(4) P6	120	41.2	14000	76 SF
(2) PLT	AC/DC	-	-	4 SF
(65) XE	120	97	39975	195 SF
(5) XEC	120	7.5	3075	15 SF
(5) HP-III+	120	36.25	14845	15 SF
(5) LOW PRT	120	1.05	340	10 SF
TOTAL	120	241.3	85040	398 SF

TABLE E

ECHELON 7-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
PORT BAR	-	-	-	
P4	120	10.3	3500	19 SF
(7) XR	120	10.5	4305	21 SF
XRC	120	1.5	615	2 SF
HP-III +	120	7.25	2969	3 SF
TOTAL	120	29.55	11389	45 SF

TABLE E

ECHELON 7-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(3) PORT BAR	-	-	-	-
P1	120	10.3	3500	19 SF
P4	120	10.3	3500	19 SF
(8) XR	120	12	4920	24 SF
(2) XRC	120	3	1230	4 SF
(2) HP-III	120	14.5	5938	6 SF
TOTAL	120	50.10	19088	72 SF

TABLE E

ECHELON 7-3 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(3) PORT BAR	-	-	-	-
(2) P4	120	20.6	7000	26SF
(10) XR	120	15	6150	30SF
(2) XRC	120	3	1230	4SF
(2) HP-III	120	14.5	5938	6SF
TOTAL	120	53.1	20318	66SF

TABLE E

ECHELON 7-4 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(3) PORT BAR	-	-	-	-
(2) P4	120	20.6	7000	26SF
(10) XR	120	15	6150	30SF
(2) XRC	120	3	1430	4SF
(2) HP-III+	120	14.5	5938	6SF
TOTAL	120	53.10	20518	66SF

TABLE E

ECHELON 8-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P3	120	10.3	3500	13SF
(4) XR	120	6	2460	12SF
XRC	120	1.5	615	2SF
HP-III	120	7.25	2969	3SF
TOTAL	120	25.05	9544	30SF

TABLE E

ECHELON 8-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
PORT BAR	-	-	-	-
P3	120	10.3	3500	13SF
(5) XR	120	7.5	3075	15SF
XRC	120	1.5	615	2SF
HP-III	120	7.25	2969	3SF
TOTAL	120	26.55	10159	33SF

TABLE E

ECHELON 8-3 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(31) DEC-A	120	469	107198	403SF
(5) PORT BAR	-	-	-	-
(5) BAR TET	-	-	-	-
(62) P6	120	638.6	217000	806SF
(5) PLT	AC/DC	-	-	10SF
(504) XE	120	756	309960	1512SF
(62) XEC	120	93	38130	186SF
(62) XEL	120	93	38130	186SF
(31) HP-SI	120	232.5	92039	93SF
(31) HP-III+	120	232.5	92039	93SF
TOTAL	120	2541.6	894496	3289SF

TABLE E

ECHELON 8-4 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(32) DEC-A	120	512	110656	416SF
(5) PORT BAR	-	-	-	-
(5) BAR TET	-	-	-	-
(64) P6	120	659.2	224000	832SF
(5) PLT	AC/DC	-	-	10SF
(520) XE	120	780	319800	1560SF
(64) XEC	120	96	39360	192SF
(64) XEL	120	96	39360	192SF
(32) HP-SI	120	232	95008	96SF
(32) HP-III+	120	232	95008	96SF
TOTAL	120	2095.2	923192	3394SF

TABLE E

ECHELON 8-5 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P2	120	10.3	3500	13SF
P4	120	10.3	3500	13SF
(2) XRC	120	3	1230	4SF
(2) XRL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
TOTAL	120	41.1	15398	42SF

TABLE E

ECHELON 9-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-E	120	16	3458	13SF
(2) DEC-M	120	48	24480	26SF
MAP	120	10.3	3405	13SF
P4	120	10.3	3500	13SF
P6	120	10.3	3500	13SF
(2) PLT	AC/DC	-	-	4SF
(12) XE	120	18	7380	36SF
(2) XEC	120	3	1230	6SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(2) LOW PRT	120	.42	170	4SF
2DRAWER SAFE	-	-	-	8SF
TOTAL	120	133.82	54291	148SF

TABLE E

ECHELON 9-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-E	120	16.0	3458	13SF
(2) DEC-M	240	48	24480	26SF
MAP	120	10.3	3405	13SF
P4	120	10.3	3500	13SF
P6	120	10.3	3500	13SF
(2) PLT	AC/DC	-	-	4SF
(14) XE	120	21	8610	42SF
(2) XEC	120	3	1230	6SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(2) LOW PRT	120	.42	170	4SF
2DRAWER SAFE	-	-	-	4SF
TOTAL	120/240	136.82	55521	150SF

TABLE E

ECHELON 9-3 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-E	120	16	3458	13SF
(2) DEC-M	240	48	24480	26SF
P4	120	10.3	3500	13SF
(2) P6	120	20.6	7000	26SF
(2) PLT	AC/DC	-	-	4SF
(30) XE	120	45	18450	90SF
(3) XEC	120	4.5	1845	9SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(2) LOW PRT	120	.42	170	4SF
2DRAWER SAFE	-	-	-	4SF
HPIII+	120	7.25	2969	3SF
TOTAL	120/240	169.57	69040	204SF

TABLE E

ECHELON 9-4 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-E	120	16	3458	13SF
(2) DEC-M	240	48	24480	26SF
P4	120	10.3	3500	13SF
(2) P6	120	20.6	7000	13SF
(2) PLT	AC/DC	-	-	4SF
(35) XE	120	52.5	21525	105SF
(3) XEC	120	4.5	1845	9SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(2) LOW PRT	120	.42	170	4SF
2DRAWER SAFE	-	-	-	4SF
HPIII+	120	7.25	2969	3SF
TOTAL	120/240	177.07	72115	206SF

TABLE E

ECHELON 9-5 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-E	120	16	3458	13SF
(2) DEC-M	240	48	24480	26SF
P4	120	10.3	3500	13SF
(2) P6	120	20.6	7000	13SF
(2) PLT	AC/DC	-	-	4SF
(40) XE	120	60	24600	120SF
(3) XEC	120	4.5	1845	9SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(2) LOW PRT	120	.42	170	4SF
2DRAWER SAFE	-	-	-	4SF
HPIII+	120	7.25	2969	3SF
TOTAL	120/240	184.57	75190	221SF

TABLE E

ECHELON 9-6 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-E	120	16	3458	13SF
(2) DEC-M	240	48	24480	26SF
P4	120	10.3	3500	13SF
(3) P6	120	30.9	10500	39SF
(2) PLT	AC/DC	-	-	4SF
(44) XE	120	66	27060	132SF
(4) XEC	120	6	2600	12SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(2) LOW PRT	120	.42	170	4SF
2DRAWER SAFE	-	-	-	4SF
(2) HPIII+	120	14.5	5938	6SF
TOTAL	120/240	209.62	84874	265SF

TABLE E

ECHELON 10-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-E	120	16	3458	13SF
DEC-F	240	24	9305	13SF
CAD	120	10.3	3405	13SF
(2) MAP	120	20.6	6810	13SF
4DRAWER SAFE	-	-	-	4SF
P4	120	10.3	3500	13SF
P6	120	10.3	3500	13SF
(3) PLT	AC/DC	-	-	6SF
(23) XE	120	34.5	14145	69SF
(2) XEC	120	3	1230	6SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(2) LOW PRT	120	.42	170	4SF
TOTAL	120/240	146.92	52691	179SF

TABLE E

ECHELON 10-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-E	120	16	3458	15SF
DEC-F	240	24	9305	27SF
CAD	120	10.3	3405	13SF
(2) MAP	120	20.6	6810	26SF
4DRAWER SAFE	-	-	-	10SF
P4	120	10.3	3500	19SF
(2) P6	120	20.6	7000	38SF
(3) PLT	AC/DC	-	-	6SF
(32) XE	120	48	19680	96SF
(3) XEC	120	4.5	1845	9SF
(2) XEL	120	3.0	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(3) LOW PRT	120	.63	255	6SF
HPIII+	120	7.25	2969	3SF
TOTAL	120/240	179.7	65395	280SF

TABLE E

ECHELON 10-3 EQUIPMENT/SPECIFICATIONS				
EAUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-E	120	16	3458	15SF
DEC-F	240	24	9305	27SF
CAD	120	10.3	3405	13SF
(4) MAP	120	41.2	13620	52SF
4DRAWER SAFE	-	-	-	10SF
P4	120	.3	3500	19SF
(3) P6	120	30.9	10500	57SF
(3) PLT	AC/DC	-	-	6SF
(49) XE	120	73.5	30135	147SF
(4) XEC	120	6	2460	12SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(4) LOW PRT	120	.84	340	8SF
(2) HPIII+	120	14.5	5938	6SF
TOTAL	120/240	245.1	89829	384SF

TABLE E

ECHELON 10-4 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-E	120	16	3458	15SF
DEC-F	240	24	9305	27SF
CAD	120	10.3	3405	13SF
(4) MAP	120	41.2	13620	52SF
4DRAWER SAFE	-	-	-	10SF
P4	120	10.3	3500	19SF
(6) P6	120	61.9	21000	114SF
(3) PLT	AC/DC	-	-	6SF
(86) XE	120	129	52890	258SF
(7) XEC	120	10.5	4305	21SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(7) LOW PRT	120	1.47	595	14SF
(5) HPIII+	120	36.3	14845	15SF
TOTAL	120/240	358.5	134091	576SF

TABLE E

ECHELON 10-5 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-E	120	16	3458	15SF
DEC-F	240	24	9305	27SF
CAD	120	10.3	3405	13SF
(4) MAP	120	41.2	13620	52SF
4DRAWER SAFE	-	-	-	10SF
P4	120	10.3	3500	19SF
(8) P6	120	82.4	28000	152SF
(3) PLT	AC/DC	-	-	6SF
(114) XE	120	171	70110	342SF
(9) XEC	120	13.9	5535	27SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(9) LOW PRT	120	1.89	765	18SF
(7) HPIII+	120	50.8	20783	21SF
TOTAL	120/240	439.3	165649	714SF

TABLE E

ECHELON 10-6 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-C	240	24	9305	27SF
(2) DEC-F	240	48	18610	54SF
CAD	120	10.3	3405	13SF
(4) MAP	120	41.2	13620	52SF
4DRAWER SAFE	-	-	-	10SF
P4	120	10.3	3500	19SF
(13) P6	120	133.9	45500	247SF
(3) PLT	AC/DC	-	-	6SF
(199) XE	120	298.5	122385	597SF
(14) XEC	120	21	8610	42SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(14) LOW PRT	120	3	1190	28SF
(12) HPIII+	120	87	35628	36SF
TOTAL	120/240	694.7	268921	1143SF

TABLE E

ECHELON 11-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) DEC C	240	48	18610	54SF
DEC -L	240	24	12240	27SF
4DRAWER SAFE	-	-	-	10SF
P4	120	10.3	3500	19SF
(4) P6	120	41.2	14000	76SF
(11) PLT	AC/DC	-	-	22SF
(61) XE	120	91.5	37515	183SF
(5) XEC	120	7.5	3075	15SF
(5) HPIII+	120	36.3	14845	15SF
(5) LOW PRT	120	1	425	10SF
TOTAL	120/240	259.8	104210	431SF

TABLE E

ECHELON 11-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) DEC-C	240	48	18610	54SF
DEC-L	240	24	12240	27SF
4DRAWER SAFE	-	-	-	10SF
P4	120	10.3	3500	19SF
(4) P6	120	41.2	14000	76SF
(11) PLT	AC/DC	-	-	22SF
(61) XE	120	91.5	37515	183SF
(5) XEC	120	7.5	3075	15SF
(5) HPIII+	120	36.3	14845	15SF
(5) LOW PRT	120	1	425	10SF
TOTAL	120/240	259.8	104210	431SF

TABLE E

ECHELON 12-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-A	120	16	3458	15SF
DEC-G	240	24	12240	27SF
2DRAWER SAFE	-	-	-	5.5SF
P4	120	10.3	3500	19SF
(6) P6	120	61.8	21000	114SF
(5) PLT	AC/DC	-	-	10SF
(91) XE	120	136.5	55965	273SF
(7) XEC	120	10.5	4305	21SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(5) HPIII+	120	36.3	14845	15SF
(7) LOW PRT	120	1.5	595	14SF
TOTAL	120/240	314.4	123076	525.5

TABLE E

ECHELON 12-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-A	120	16	3458	15SF
DEC-G	240	24	12240	27SF
2DRAWER SAFE	-	-	-	5.5SF
P4	120	10.3	3500	19SF
(3) P6	120	30.9	10500	57SF
(3) PLT	AC/DC	-	-	6SF
(54) XE	120	81	33210	162SF
(4) XEC	120	6	2460	12SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(2) HPIII+	120	14.5	5938	6SF
(4) LOW PRT	120	.84	340	8SF
TOTAL	120/240	201.1	78814	329.5

TABLE E

ECHELON 12-3 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-A	120	16	3458	15SF
DEC-G	240	24	9305	27SF
2DRAWER SAFE	-	-	-	5.5SF
P4	120	10.3	3500	19SF
(4) P6	120	41.2	14000	76SF
(3) PLT	AC/DC	-	-	6SF
(58) XE	120	87	35670	174SF
(5) XEC	120	7.5	3075	15SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(3) HPIII+	120	21.8	8907	9SF
(5) LOW PRT	120	1	425	10SF
TOTAL	120/240	226.3	85508	368.5

TABLE E

ECHELON 12-4 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-A	120	16	3458	15SF
DEC-G	240	24	9305	27SF
2DRAWER SAFE	-	-	-	5.5SF
P4	120	10.3	3500	19SF
(6) P6	120	30.9	10500	57SF
(5) PLT	AC/DC	-	-	6SF
(91) XE	120	73.5	30135	147SF
(7) XEC	120	6	2460	12SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(5) HPIII+	120	14.5	5938	6SF
(7) LOW PRT	120	.84	340	8SF
TOTAL	120/240	193.54	72804	339SF

TABLE E

ECHELON 12-5 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-A	120	16	3458	15SF
DEC-G	240	24	9305	27SF
2DRAWER SAFE	-	-	-	5.5SF
P4	120	10.3	3500	19SF
(4) P6	120	41.2	14000	76SF
(3) PLT	AC/DC	-	-	6SF
(58) XE	120	87	35670	174SF
(5) XEC	120	7.5	3075	15SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(3) HPIII+	120	21.8	8907	9SF
(5) LOW PRT	120	1	425	10SF
TOTAL	120/240	226.3	85508	368.5

TABLE E

ECHELON 12-6 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-A	120	16	3458	15SF
DEC-G	240	24	9305	27SF
P4	120	10.8	3500	19SF
(3) P6	120	30.9	10500	57SF
(3) PLT	AC/DC	-	-	6SF
(49) XE	120	73.5	30135	147SF
(4) XEC	120	6	2460	12SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(2) HPIII+	120	14.5	5938	6SF
(4) LOW PRT	120	.84	340	8SF
2DRAWER SAFE	-	-	-	5.5SF
TOTAL	120/240	193.6	72804	314.5

TABLE E

ECHELON 13-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P2	120	10.3	3500	19SF
(3) XR	120	4.5	1845	9SF
XRC	120	1.5	615	3SF
HPIII	120	7.25	2969	3SF
TOTAL	120	23.6	8929	34SF

TABLE E

ECHELON 13-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P3	120	10.3	3500	19SF
(5) XR	120	7.5	3075	15SF
XRC	120	1.5	615	3SF
HPIII	120	7.25	2969	3SF
TOTAL	120	26.6	10159	40SF

TABLE E

ECHELON 13-3 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P4	120	10.3	3500	19SF
(7) XR	120	10.5	4305	21SF
XRC	120	1.5	615	3SF
HPIII	120	7.25	2969	3SF
TOTAL	120	29.6	11389	46SF

TABLE E

ECHELON 14-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
2DRAWER SAFE	-	-	-	5.5SF
P4	120	10.3	3500	19SF
P6	120	10.3	3500	19SF
(16) PLT	AC/DC	-	-	32SF
(30) XE	120	45	18450	90SF
(2) XEC	120	3	1230	6SF
(2) HPIII+	120	14.5	5938	6SF
TOTAL	120	83.1	32618	177.5

TABLE E

ECHELON 15-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-C	240	24	9305	27SF
(2) DEC-M	240	48	24480	54SF
CAD	120	10.3	3405	13SF
(5) MAP	120	51.5	17025	65SF
4DRAWER SAFE	-	-	-	10SF
P4	120	10.3	3500	19SF
(4) P6	120	41.2	14000	76SF
PLOT	120	1.3	427	8SF
(2) PLT	AC/DC	-	-	4SF
(53) XE	120	79.5	32595	159SF
(5) XEC	120	7.5	3075	15SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(3) HPIII+	120	21.8	8907	9SF
(5) LOW PRT	120	1	425	10SF
TOTAL	120/240	313.9	124312	481SF

TABLE E

ECHELON 16-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) DEC-G	240	48	24480	54SF
(2) DEC-J	240	48	24480	54SF
CAD	120	10.3	3405	13SF
(5) MAP	120	51.5	17025	65SF
(3) 5DRAW SAFE	-	-	-	33SF
P4	120	10.3	3500	19SF
(23) P6	120	268	80500	437SF
PHC	120	.51	210	2SF
PLOT	120	1.3	427	8SF
(2) PLT	AC/DC	-	-	4SF
(91) XE	120	136.5	55965	273SF
(7) XEC	120	10.5	4305	21SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(22) HPIII+	120	159.5	65318	66SF
(24) LOW PRT	120	5	2040	48SF
TOTAL	120/240	766.91	288823	1109SF

TABLE E

ECHELON 16-3 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
CAD	120	10.3	3405	13SF
(2) MAP	120	20.6	6810	26SF
P4	120	10.3	3500	19SF
(3) P6	120	30.9	10500	57SF
PLOT	120	1.3	427	8SF
(2) PLT	AC/DC	-	-	4SF
(2) HP-SI	120	14.5	5938	6SF
(2) HPIII+	120	14.5	5938	6SF
(4) LOW PRT	120	.84	340	8SF
(2) DEC-E	120	32	6916	30SF
4DRAWER SAFE	-	-	-	10SF
TOTAL	120	135.3	43774	187SF

TABLE E

ECHELON 16-4 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
CAD	120	10.3	3405	13SF
(2) P6	120	20.6	7000	38SF
PLOT	120	10.3	427	8SF
(2) PLT	AC/DC	-	-	4SF
(2) HP-SI	120	14.5	5938	6SF
(2) LOW PRT	120	.42	170	4SF
(2) DEC-E	120	32	6916	30SF
2DRAWER SAFE	-	-	-	5.5SF
TOTAL	120	79.2	23856	108.5

TABLE E

ECHELON 16-7 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-G	240	24	12240	27SF
P4	120	10.3	3500	19SF
P6	120	10.3	3500	19SF
(5) PLT	AC/DC	-	-	10SF
(22) XE	120	33	13530	66SF
(2) XEC	120	3	1230	6SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(2) LOW PRT	120	.42	170	4SF
2DRAWER SAFE	-	-	-	5.5SF
DEC-A	120	16	3458	15SF
TOTAL	120/240	114.5	44796	183.5

TABLE E

ECHELON 16-8 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-G	240	24	12240	27SF
P4	120	10.3	3500	19SF
(6) P6	120	61.8	21000	114SF
(5) PLT	AC/DC	-	-	10SF
(91) XE	120	136.5	55965	273SF
(7) XEC	120	10.5	4305	21SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(5) HPIII+	120	36.3	14845	15SF
(7) LOW PRT	120	1.5	595	14SF
2DRAWER SAFE	-	-	-	5.5SF
DEC-A	120	16	3458	15SF
TOTAL	120/240	314.4	123076	525.5

TABLE E

ECHELON 16-9 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P1	120	10.3	3500	19SF
(8) XR	120	12	4920	24SF
(2) XRC	120	3	1230	6SF
P4	120	10.3	3500	19SF
(5) PLT	AC/DC	-	-	10SF
(2) HPIII+	120	14.5	5938	6SF
2DRAWER SAFE	-	-	-	5.5SF
TOTAL	120	50.1	19088	89.5

TABLE E

ECHELON 17-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) DEC-F	240	48	18610	54SF
(4) DEC-I	240	96	48960	108SF
(4) 4DRAW SAFE	-	-	-	40SF
P4	120	10.3	3500	19SF
(42) P6	120	432.6	147000	798SF
(80) PLT	AC/DC	-	-	160SF
(618) XE	120	927	380070	1845SF
(43) XEC	120	64.5	26445	129SF
(4) XEL	120	6	2460	12SF
(4) HP-SI	120	29	11876	12SF
(39) HPIII+	120	282.8	115791	117SF
(43) LOW PRT	120	9	3655	86SF
TOTAL	120/240	1905.2	758367	3389

TABLE E

ECHELON 17-2 EQUIPMENT/SPECIFICATIONS				
DEC-F	240	24	9305	27SF
DEC-I	240	24	12240	27SF
4DRAWER SAFE	-	-	-	10SF
P4	120	10.3	3500	19SF
(13) P6	120	133.9	45500	247SF
(20) PLT	AC/DC	-	-	40SF
SCAN	120	4.21	485	3SF
(204) XE	120	306	125460	612SF
(14) XEC	120	21	8610	42SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	6SF
(12) HPIII+	120	87	35628	36SF
(14) LOW PRT	120	2.94	1190	28SF
TOTAL	120/240	630.9	249086	1103

TABLE E

ECHELON 18-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P1	120	10.3	3500	19SF
P4	120	10.3	3500	19SF
(8) XR	120	12	4920	24SF
(2) XRC	120	3	1230	6SF
(2) HPIII	120	14.5	5938	6SF
TOTAL	120	50.1	19088	74SF

TABLE E

ECHELON 18-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) PORT BAR	-	-	-	2SF
P2	120	10.3	3500	19SF
P4	120	10.3	3500	19SF
(9) XR	120	13.5	31500	27SF
(2) XRC	120	3	7000	6SF
(2) HPIII	120	14.5	5938	6SF
TOTAL	120	51.6	51438	79SF

TABLE E

ECHELON 18-3 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
P4	120	10.3	3500	19SF
(2) P6	120	20.6	7000	38SF
(35) XE	120	52.5	21525	105SF
(3) XEC	120	4.5	1845	9SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	14SF
HPIII+	120	7.25	2969	3SF
DEC-A	120	16	3458	15SF
TOTAL	120	128.65	47465	209SF

TABLE E

ECHELON 18-4 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(3) PORT BAR	-	-	-	2SF
(2) P4	120	20.6	1230	38SF
(14) XR	120	21	8610	42SF
(2) XRC	120	3	1230	6SF
(2) HPIII	120	14.5	5938	6SF
TOTAL	120	59.1	17008	92SF

TABLE E

ECHELON 19-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(5) PORT BAR	-	-	-	2SF
P4	120	10.3	3500	19SF
(6) XR	120	9	3690	18SF
XRC	120	1.5	615	3SF
HPIII	120	7.25	2969	3SF
TOTAL	120	28.1	10774	43SF

TABLE E

ECHELON 19-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(5) PORT BAR	-	-	-	2SF
P4	120	10.3	3500	19SF
(7) XR	120	10.5	4305	21SF
XRC	120	1.5	615	3SF
HPIII	120	7.25	2969	3SF
TOTAL	120	29.55	11389	46SF

TABLE E

ECHELON 19-3 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(5) PORT BAR	-	-	-	2SF
P4	120	10.3	3500	19SF
P1	120	10.3	3500	19SF
(7) XR	120	10.5	4305	21SF
(2) XRC	120	3	1230	6SF
(2) HPIII	120	14.5	5938	6SF
TOTAL	120	48.6	18473	71SF

TABLE E

ECHELON 20-1 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) DEC-C	240	48	18610	54SF
(6) DEC-M	240	144	55830	162SF
CAD	120	10.3	3405	13SF
(5) MAP	120	51.5	17025	65SF
(2) 5DRAW SAFE	-	-	-	11SF
(2) P4	120	20.6	7000	38SF
(42) P6	120	432	147000	798SF
PLOT	120	1.3	427	8SF
(150) PLT	AC/DC	-	-	300SF
(642) XE	120	963	394830	1926SF
(44) XEC	120	66	27060	132SF
(8) XEL	120	12	4920	24SF
(8) HP-SI	120	58	23752	24SF
(36) HPIII+	120	261	106884	108SF
(44) LOW PRT	120	9.24	3740	88SF
TOTAL	120/240	2076.94	810456	3751SF

TABLE E

ECHELON 20-2 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
DEC-F	240	24	9305	27SF
DEC-I	240	24	9305	27SF
4DRAWER SAFE	-	-	-	10SF
P4	120	10.3	3500	19SF
(15) P6	120	154.5	52500	285SF
(24) PLT	120	-	-	48SF
(232) XE	120	348	142680	696SF
(16) XEC	120	24	9840	48SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	14SF
(14) HPIII+	120	101.5	41566	42SF
(16) LOW PRT	120	3.4	1360	32SF
TOTAL	120/240	707.2	277224	1254SF

TABLE E

ECHELON 20-3 EQUIPMENT/SPECIFICATIONS				
EQUIPMENT	VOLTS	AMPS	BTU/HR	AREA
(2) DEC-M	240	48	18610	54SF
2DRAWER SAFE	-	-	-	5.5SF
P4	120	10.3	3500	19SF
P6	120	10.3	3500	19SF
PLT	-	-	-	2SF
(21) XE	120	31.5	12915	63SF
(2) XEC	120	3	1230	6SF
(2) XEL	120	3	1230	6SF
(2) HP-SI	120	14.5	5938	14SF
TOTAL	120/240	120.6	46923	188.5

Appendix F

RCAS Preliminary Draft Security Plan

NOTES

Provided in this appendix, are pages from the draft security plan. The purpose of this appendix is to inform the reader briefly on some of the aspects of Physical, Communication and Tempest security. Changes are probable upon final approval.

DEPARTMENT OF THE ARMY
PROGRAM MANAGEMENT OFFICE
RESERVE COMPONENT AUTOMATION SYSTEM
NEWINGTON, VIRGINIA 22122-8510

NGB-RC-SDE 25 February 1993

MEMORANDUM FOR THE DIRECTOR OF INFORMATION SYSTEMS FOR COMMAND, CONTROL, COMMUNICATIONS, AND COMPUTERS (DISC4), ATTN: SAIS-SD, RM 3C560, THE PENTAGON, WASHINGTON, DC 20310

SUBJECT: Essential Personnel, Physical, and Communications Security Protections for the Reserve Component Automation System (RCAS) Facilities

1. References:

a. AR 190-13, The Army Physical Security Program.

b. AR 190-51, Security of Army Property at Unit and Installation Level.

c. AR 380-5, Department of the Army Information Security Program.

d. AR 380-19, Department of the Army Information Systems Security.

e. AR 380-19-1 (C), Department of the Army Control of Compromising Emanations (U)

f. AR 380-67, The Department of the Army Personnel Security Program.

g. DA PAM 25-380-2, Security Procedures for Controlled Cryptographic Items.

h. [redacted] DA PAM 25-380-XX, Communications Security Procedures

i. [redacted] PAM 190-51, Risk Analysis for Army Property.

j. DOD 5220.22-M, Department of Defense Industrial Security Manual for Safeguarding Classified Information.

k. FM 19-30, Physical Security.

l. SAIS-SS Memorandum, Subject: Security Procedures for the Secure Telephone Unit, Third Generation (STU III).

2. With fielding of the RCAS to several thousand locations and operating in an extremely scarce resource environment, it is necessary to prescribe a security regime that is cost effective and within bounds of acceptable risk. Having carefully reviewed current security policy, the following baseline security measures are considered consistent with the threat and within bounds of reasonable risk. These guidelines will serve as a guide for the installation of the RCAS and provide approving officials and commanders at all levels a presumptively acceptable security baseline. Request your approval of the security measures described below.

3. The RCAS security policy is derived from existing policy and guidance specifically documented in AR 380-5, AR 380-19, AR 190-13, and the regulations referenced by them. The goals of this policy are to limit access to classified information to properly cleared individuals with a valid need to know; to limit access to sensitive unclassified information to those individuals who require that information to perform their work; and to safeguard those resources needed for mission accomplishment against accidental or intentional harm. The RCAS security policy consists of a subset of existing policies appropriate to the specific components which comprise RCAS, the environment in which those components are used, and those security safeguards which can be most cost-effectively implemented for these components in these environments. This memorandum outlines the essential personnel, physical and communications security safeguards for the RCAS.

4. **System Overview.** The RCAS architecture is designed to provide all security features required to meet standards for accreditation for multilevel security operations at a B-1 level of trust. SECRET, CONFIDENTIAL, and SENSITIVE-UNCLASSIFIED information will be processed in the system with all RCAS users cleared to at least the CONFIDENTIAL level. The RCAS facilities environment consists primarily of small computers, where the computing environment is essentially superimposed upon the work environment. While a number of different equipment configurations exist to meet the specific needs of some 9,800 units at 4,700 locations, two basic architectures, the large and small echelon configurations, are representative of the system.

a. The small echelon configuration is characterized by a single server on which both standard office automation software and RCAS applications software reside. The RCAS small echelon processor is a Zenith 80486 33MHz PC with the following features:

- 24 to 64Mb Memory (Depending on site needs)
- 5.25" 1.2 Mb and 3.5" 1.44 Mb floppy drives
- Serial & Parallel Ports
- Small Computer System Interface (SCSI) adapter
- SCSI CD-ROM drive (For CBT & system documentation)
- Removable SCSI hard disks
- 8mm Tape drive for backup & bulk data loading

A four-bay tower provided with this machine holds the CD ROM, multiple hard drives, and tape drive for back up. The operating system on this processor is Santa Cruz Operations (SCO) UNIX with SecureWare CMW+ providing computer security. The SecureWare product is designed to the DIA CMW standard. This processor is connected to multiple X-Station terminals over an IEEE 802.3 compliant local area network. The operating system uses Secure X-Server to provide labeled windows and trusted path protection to the X-Stations. Classified information is stored on a separate hard disk which is removed and stored in a government approved safe when not in use. The 5 1/4" and 3 1/2" drives on the processor console can be logically locked by the system administrator to prevent unauthorized access to software. All printing is done by laser printers, eliminating security risks associated with impact printers. Printers are connected directly to the server, eliminating potential unauthorized LAN access. All printer output will automatically receive appropriate sensitivity markings. LAN cables installed in non-secure areas will have cost effective approved Protected Distribution Systems (PDS) or encryption as required at each location depending on which is more cost effective. Telecommunications protocols preserve the security labels assigned by the operating system, and transport these labels between servers without degrading the trustedness of the overall system. This support is based on the DNSIX standard, and both TCP/IP and GOSIP protocols are supported. Small echelons are connected to the RCAS wide area network (WAN) communications hubs through a dial-up X.25 line running under CLNP and secured with an AT&T Secure Data Device (SDD). The AT&T SDD is an NSA-endorsed Type 1 encryption device providing data link encryption at 9600 Baud. This device can support electronic over-the-air rekeying.

b. The basic architecture described above is extended in the large echelon configuration to support a greater number of users and their accompanying workload. The large echelon configuration is characterized by multiple servers (Zenith 80486 and DEC RISC processors) which separately handle office automation and applications/database functions. Applications and database functions reside on DEC system 5000 series RISC machines with the following characteristics:

- 128 to 256 Mb Memory (Depending on site needs)
- 2.0 to 10 Gb Disk capacity
- 8 or 20 page-per-minute Laser Printers
- Ethernet and SCSI Adapters
- 9 Track Tape Drive for backup & bulk data loading
- CD ROM Drive (For CBT & System documentation)

The operating system for the DEC RISC servers is DEC ULTRIX with MLS+ for computer security. The MLS+ is a SecureWare CMW product modified to run with DEC ULTRIX. It is engineered to the same DIA CMW standard as the CMW package on the Zenith machines. All RCAS developed applications and database functions are performed on the DEC RISC machines. Office automation processing continues to be done on Zenith 80486 servers with the same office automation software and features as the Zenith machines in the small echelon configurations. Larger echelons are generally connected to the WAN over dedicated FTS 2000 circuits from IEEE 802.3 ports. Traffic on these circuits is encrypted using the Motorola Network Encryption System (NES). The Motorola NES is an end-to-end encryption device designed to SDNS standards and is on the NSA Endorsed Cryptographic Products List. Like the SDD, this device can support electronic over-the-air-rekeying. Each large echelon has a NES device which handles all RCAS communications using GOSIP protocols, and a NES device dedicated to encrypting network management information using TCP/IP and SNMP protocols.

c. Some echelons have laptop computers to provide portable office automation to users. The laptops provided are Zenith 80386 Supersport machines using SCO Open Desk Top operating system software without CMW security extensions. This software provides C2 level security functions. Standard operating procedures will mandate that only unclassified processing take place on these machines. Additionally, there are a number of security features which protect the RCAS from possible misuse of these laptops. The laptops can only be accessed by users with an authorized password and ID. The laptops are accompanied by a STU-III/LE keyed for unclassified traffic. The home unit's

automated access control system ensures that connection can only be made to properly keyed encryption units which are individually identified and known to the system. All laptops will be identified to the system as single level unclassified devices and will not be able to access any classified information. Additionally, the remote user will need a second password and ID to access the host server for file transfer. The connection of the laptop to the home system is through a port on one of the servers rather than directly to the LAN, allowing the trusted operating system to insure all information being exchanged is unclassified and labeled as such. All of these actions are audited for later review.

5. **Personnel Security.** Users of the RCAS, issued a user identification and password, with direct access to the system, and who receive output or generate input, must have a minimum clearance of CONFIDENTIAL and a need-to-know for the information accessed. Uncleared users are not permitted access to the RCAS. This applies to all military, civilian and contractor personnel requiring access to the RCAS. This is consistent with requirements for processing SENSITIVE-UNCLASSIFIED, CONFIDENTIAL and SECRET information in an MLS system at the B-1 level of trust.

6. **Physical Security for RCAS Facilities.**

a. An RCAS facility where the computing environment is essentially superimposed upon the office environment, is configured for multilevel processing of UNCLASSIFIED-SENSITIVE, CONFIDENTIAL, and SECRET information, and has computing equipment with classified files residing on removable media only, must comply with the following minimum security procedures:

(1) The facility must be attended by RCAS-cleared personnel when the equipment is in operation and when classified information is accessible in any form.

(2) Access to the RCAS facility must be controlled by RCAS personnel at all times.

(3) Uncleared persons entering the RCAS facility will be escorted by RCAS personnel at all times. Dividers, partitions or acoustical panels may be used to delineate or divide out the work space to provide some access controls and acoustical panels may be used to bound a space. However, these measures will be used to enhance or supplement security access controls, and will

not be used as an alternative to continuous escort by authorized RCAS personnel.

(4) The facility will provide for the protection of classified information from unauthorized viewing.

(5) The facility door(s) will provide security comparable to that provided by the walls of the facility. The doors will be locked when the RCAS facility is not in operation or attended by assigned RCAS personnel.

(6) Windows will have individual locking devices and will be covered, if necessary, to prevent viewing of classified and unclassified-sensitive information being processed. Windows at the basement level or accessible from other access points, may be rendered opaque by painting and protected by screening or barring, as identified in AR 380-5, Appendix H, subsection H-9.

(7) Approved GSA security containers will be used for storing and safekeeping classified information, including removable computer media containing classified information and software when not under the direct control of properly cleared and authorized RCAS personnel.

(8) To comply with Army regulations for protecting high-dollar value equipment, installed equipment, such as the Zenith 80486, that has had its removable media secured in a GSA approved security container, must be stored in a locked office or building during non-duty hours to prevent loss or damage. The removable media must be stored in a GSA approved security container. Users will log off the system, turn off the computer(s), and carry out procedures to secure the work space before they leave the area.

b. Computer systems such as the DEC 5000 and 5500 that have internal, non-removable storage media and keyed communications security systems (such as the Motorola Network Encryption System) used for processing classified national security information, require additional planning before they are placed into operation in an RCAS facility. The most cost-effective approach must be taken to achieve a requisite level of security protection for the information and for high-dollar value systems.

(1) When secure areas exist, they will be used for these systems.

(2) When such space is not available, the most cost effective approach will be selected from the following alternatives (in addition to the security procedures outlined in paragraphs 6.a. (1) through (8) above). If construction of a secure facility is necessary, the space selected for renovation will be kept a small as possible.

(a) The computer system's non-removable media may be used for the storage of unclassified and unclassified-sensitive (US2) information only: all classified information will be directed to a removable storage device (storage tower). When the system is unattended, all classified storage media, and the communications security keying materials will be removed from their respective systems and secured in a GSA approved security container, or

(b) The computer system(s) and communications security system(s) will be placed in a GSA approved security container for equipment, or

(c) The office area (space) in which the computer systems and communications security systems are to be installed will be upgraded to meet the secure storage standards established in AR 380-5, Appendix H, Section II. Specifically, walls, floors, windows, ceilings, doors and miscellaneous openings must be secured using specified building materials, hardware and door-locking devices.) As a minimum, entrance doors will be substantially constructed of wood or metal and will be equipped with a GSA approved, built-in, three position combination lock. Depending on a local threat assessment, location of the RCAS facility, amount of classified information being processed, and other issues to be considered prior to upgrading the facility, an alarm system may be required to secure the area. As authorized by AR 380-5, 5-102b, the MACOM Commander may approve exceptions to or delegate the authority to approve exceptions to storage standards outlined in Appendix H of the regulation. These officials should be the approving officials for the use of alarm systems at RCAS facilities.

c. Installed and keyed Controlled Cryptographic Items (CCI) are classified but should be protected at the same level as the information they protect. Keyed CCI equipment must be appropriately supervised by an authorized and properly cleared individual.

d. Installed unkeyed and unattended CCI are not considered to be in storage and, therefore, a security storage structure, as defined in AR 190-51, Appendix B, is not required for their protection (per DA PAM 25-380-2). Physical security measures and procedures used to protect desk-top computers and other office equipment, such as placement in a locked office or locked building during nonduty hours, are also adequate for CCI in the office environment. The measures for providing physical security for CCI must be effective and within boundaries of acceptable risk.

7. **Communications Security in RCAS.**

a. **Transmission Security.** Transmission security for the RCAS is provided by encryption using the Motorola Network Encryption System (NES) or AT&T Secure Data Device (ATT-SDD), or by protected distribution systems. Local area network (LAN) cable/lines are protected through access control and the physical security afforded by the RCAS facility itself.

(1) COMSEC devices. The NES and ATT-SDD are unclassified Controlled Cryptographic Items. Protection of these devices will be in accordance with SAIS-SS Memorandum on STU III guidance and DA PAM 25-380-2, Security Procedures for Controlled Cryptographic Items.

(2) Protected Distribution Systems (PDS). The purpose of a PDS is to provide physical protection of the transmission lines when COMSEC equipment is not used. PDS will be used within the RCAS only when it is clearly the more cost effective approach. The following criteria apply:

(a) The RCAS data distribution system (wire or optical fiber cable) within an RCAS facility is not a part of a PDS. The distribution system within an RCAS facility is adequately protected by the physical security afforded the facility itself.

(b) A PDS consists of the data distribution cables (wire or optical fiber) that extend between RCAS facilities where physical security protecting the transmission line is less than that afforded the facilities. Where the physical security between linked RCAS facilities is constant from end-to-end, a PDS is not required.

(c) The PDS cable passing information between RCAS facilities will be installed in a way that it can be regularly inspected at random by designated RCAS users to determine if the PDS has been tampered with in any way.

(d) The PDS will be installed so that it is not conveniently accessible for tampering. When possible, it will be installed high and visible to a number of government employees frequently present within the space in or through which the PDS cable passes.

(e) All PDS will be inspected at least daily. For facilities operating only during normal business hours, one inspection will be accomplished prior to starting daily operations. Additional inspections will be conducted as determined necessary by the local security manager. A record of inspections will be maintained. Detection of tampering will be immediately reported to the local RCAS security official.

(f) PDS installed outside the normal regular view of RCAS users or other government employees, but still inside of a government owned and operated building, will be inspected at least twice daily. Where the cable is most vulnerable to tampering, a protective cover should be placed over the cable to make tampering difficult. Duct, conduit, or PVC may be used for this purpose.

(g) Protective cover, if used, should be installed so as to require several minutes to penetrate, and be high and visible so that someone would see and/or hear an intruder attempting to access the PDS cables directly.

(h) When PDS is installed between government owned and operated buildings where individuals outside of the federal government are not allowed without escort, covering the cables is not necessary. However, more frequent inspection of the cable is required.

(i) RCAS equipment attached to communications/data distribution cables do not act as transmitters, in that the electromagnetic energy dissipated is not sufficient to transmit beyond an area/volume within bounds of acceptable risk. Also, the equipment attached should not interfere in any way with other communication devices (e.g., radio/television receivers) outside of the established area/volume boundaries.

b. **TEMPEST countermeasures in the RCAS.**

(1) Based on guidance at paragraph 3-5, b., and table 3-3, AR 380-19-1, the protection level for the RCAS, within the United States and in low opportunity environments, is determined to be Level VI. Where RCAS sites are to be located inside the United States in a high opportunity environment, or outside the United States, protection measures will be determined for those sites consistent with guidance in AR 380-19-1. Protection levels higher than Level V are unlikely to exist within the RCAS.

(2) Based on paragraph 3-4(U), Level VI has no TEMPEST requirements. Level V requires third-wire AC protective ground on equipment.

(3) Baseline TEMPEST countermeasures provided by the RCAS are adequate for sites requiring Level V protection.

(a) Baseline TEMPEST countermeasures for RCAS LANs include the use of shielded twisted pair cabling (Belden, Data Twist, 1458A, CMP, 4PR24, shielded, UL or equivalent).

(b) Physical separation between classified and unclassified systems, equipment and cables, and prescribed grounding of all system components, consistent with vendor and/or other approved grounding methods, will be accomplished during installation of the RCAS site. Separation will be consistent with guidance in AR 380-19-1.

(c) RED RCAS shielded, twisted pair cable installed in a RED duct can co-exist with other RED metallic cable and optical fiber cable in the duct.

(d) When RED RCAS cable will co-exist with and be parallel to BLACK cable up to a distance of 30 meters(100′), a separation of 50 mm (2") or more will be maintained between them, measuring the separation between them from the outside perimeter of each cable.

(e) Where RED RCAS cable will co-exist with and be parallel to BLACK metallic cable for over 30 meters (100′), 150mm (6") separation will be maintained.

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(f) Using optical fiber, glass or plastic cable for distribution is an option provided in the Boeing contract. The appropriate cable will be determined during the fielding process.

(g) To ensure cost-effective, security-oriented maintenance, all RCAS systems and facilities configurations will be strictly controlled. PMO RCAS approval is required for any changes after installation.

(4) Consistent with requirements found at paragraph 3-7(U), sub paragraph b. (U), Contractor activities, AR 380-19-1, Boeing will complete and forward an abbreviated Facility TEMPEST Assessment/Risk Analysis (FTA/RA) for each contractor owned and operated RCAS site, to the PM RCAS for review, approval, and forwarding the 902nd MI Battalion.

8. This memorandum will be included as a part of the RCAS Accreditation. The technical points of contact for this action within the Program Management Office, RCAS are Mr. Al Kondi and Ms. Victoria Thompson, Systems Development Division, (703) 339-2114/2117.

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